Canadian Pandemic Influenza Plan

INFORMATION NOTICE

The Canadian Pandemic Influenza Plan (the Plan) was developed through a collaborative process between Federal, Provincial, Territorial, local and regional governments and non-government stakeholders.

Development of the Plan was coordinated by Health Canada with direction from the Pandemic Influenza Committee, a federal, provincial and territorial advisory committee. The Plan is provided for information purposes only as an outline for the planning, preparedness and response to pandemic influenza by governments within their respective roles and responsibilities.

Terms and definitions contained in the Plan are for convenience only. It is the User's responsibility to determine if any term or definition contained in the Plan is appropriate for the purposes for which it is intended to be used by the User.

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Foreword and Acknowledgements

The Canadian Pandemic Influenza Plan maps out how Canada will prepare for and respond to a pandemic influenza outbreak. It does so by clarifying the roles and responsibilities of those who would be involved in such a public health emergency – governments at all levels, public health officials and front-line health care workers. As a practical working tool, it also provides guidelines and checklists to assist various jurisdictions with their emergency planning.

The ultimate goal of the Plan is to minimize serious illness and death, in the event of an influenza pandemic, and also to ease any social or economic disruption that might be caused by a massive outbreak of the disease. Canada has had a pandemic influenza plan since 1988, and it continues to evolve based on research, evidence and lessons learned.

The **Canadian Pandemic Influenza Plan** is the product of extensive dialogue and collaboration within the *Pandemic Influenza Committee (PIC)*. Created in 2001, PIC consists of 17 voting members, including representatives from all provinces and territories. Expertise within PIC includes Chief Medical Officers of Health, epidemiologists, virologists, communicable disease specialists, clinical, public health and laboratory specialists.

Committee members, in turn, have been greatly assisted through a process of consultation with a wider group of stakeholders, including the health non-government organization community, local governments, emergency planners, and bioethicists.

For the past two years, we have had the privilege of serving as co-chairs of the Pandemic Influenza Committee. It has been an immensely enriching experience, to watch the current document take shape and to see the sheer amount of time, dedication and commitment poured into the creation of the current document. We would like to thank all those whose contribution helped bring the Plan off the "drawing board" and into reality.

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- Canadian Paediatric Society
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- Fédération des médecins omnipracticiens du Québec
- Funeral Service Association of Canada
- National Advisory Committee on Immunization (NACI)
- Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP)
- Pan American Health Organization
- Royal Canadian Mounted Police
- St. John Ambulance
- Solicitor General Canada
- The Salvation Army
- The Adventist Development and Relief Agency Canada
- The Mennonite Disaster Service
- The Christian Reformed World Relief Committee of Canada
- The Red Cross Society of Canada
- VON Nurses
- World Health Organization

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PREFACE

Preface

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. Advanced planning for a large scale and widespread health emergency is required to optimize health care delivery during a pandemic. Unlike other public welfare emergencies, an influenza pandemic will impact on multiple communities across Canada simultaneously. Each local jurisdiction must be prepared to respond in the context of uncertain availability of external resources and support. Therefore, contingency planning is required to mitigate the impact of an influenza pandemic through planning and preparation by the co-ordinated efforts of all orders of government in collaboration with their stakeholders.

The *Canadian Pandemic Influenza Plan* (the Plan) consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Each section aims to assist and facilitate appropriate planning at all levels of government for the next influenza pandemic. The Centre for Infectious Disease Prevention and Control (CIDPC), Population and Public Health Branch (PPHB), Health Canada coordinated the development of the Plan in collaboration with the Centre for Emergency Preparedness and Response (CEPR), Health Canada, with direction from the Pandemic Influenza Committee (PIC).

The Plan and the annexed guidelines, checklists and other documents were developed to assist all jurisdictions with the main components of planning, including surveillance, vaccine programs, use of antivirals, health services, emergency services, public health measures and communications. The most effective public health intervention to mitigate the impact of a pandemic is through immunization with an effective vaccine against the novel virus, and, to a lesser extent, through the use of antiviral drugs. In addition, comprehensive planning requires that appropriate surveillance capacity is in place, and that the health sector, emergency services and communities as a whole are informed and equipped to deal with a pandemic.

The prevention and preparedness activities facilitate the response and recovery during and after an influenza pandemic. The response to a pandemic will require close cooperation between all levels of government. The response and recovery sections of the Plan were developed through a collaborative process between the Centre for Emergency Preparedness and Response, and the CIDPC, Health Canada. The response section of the Plan addresses the operational activities for an effective national response, including essential federal, provincial and territorial coordination. The recovery section provides guidance on coordinated post-event activities for the health and emergency response sectors.

The overall goal of pandemic influenza preparedness and response is first to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.

The Plan is intended to be dynamic and iterative, and will be updated and revised regularly.

Canadian Pandemic Influenza Plan: Content Summary

- Preface
- Content Summary
- List of Annexes

Who does this plan address? →

Who is responsible for Pandemic Planning? →

I. Introduction

- Goal of Influenza Pandemic Preparedness and Response
- Overview of the Canadian Pandemic Influenza Plan
- Roles and Responsibilities
  - The Pandemic Influenza Committee
  - The Pre-Pandemic Period
  - The Pandemic Period
  - The Post-Pandemic Period

← *Where can I find guidelines and supporting documentation?*

Why is this an important health issue? →

II. Background

- Epidemiology of Pandemic Influenza
- Estimated Impact of an Influenza Pandemic on Canadians
- Terminology
  - Pandemic Phases
  - List of Abbreviations
- Legal Considerations
- Ethical Considerations

What preparations are being made? →

III. Preparedness Section

- Introduction (to Preparedness Section)
  - Background
  - Populations under Federal Jurisdiction
- Components of the Preparedness Section
  - Surveillance
  - Vaccine Programs
  - Antivirals
  - Health Services Emergency Planning
  - Emergency Services
  - Public Health Measures
  - Communications
- Planning Activities by Components
  - Pandemic Planning Checklists

← *What principles and assumptions should planners consider?*

← *What are the outstanding issues?*

What needs to happen in a comprehensive response? →

IV. Response Section

- Introduction (to Response Section)
- Phased Approach
- Experience to Date
- Key Response Activities by Pandemic Phase

← *What response activities should take place during each phase?*

What will be involved in the recovery from a pandemic? →

V. Recovery Section

- Currently in development

Annexes

- See "List of Annexes"

← *Where can I find specific/technical information?*

Section One

INTRODUCTION

1.1 Goal of Influenza Pandemic Preparedness and Response

The goal of influenza pandemic preparedness and response is:

> *First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.*

This goal will only be realized through the co-ordinated efforts of all orders of government in planning and preparation.

The objectives of the Canadian Pandemic Influenza Plan are as follows:

To assist and facilitate appropriate planning and response at all levels of government by:

- developing a national Plan through a F/P/T collaborative process, which is acceptable and applicable to all stakeholders, and clearly identifies roles and responsibilities,
- developing a Plan that is sufficiently flexible to account for the unknown epidemiology of a pandemic and the needs of different stakeholders,
- recommending planning considerations for the appropriate prevention, care and treatment during a pandemic,
- recommending planning considerations for appropriate communications, resource management and preventive measures to minimize societal disruption.

To provide a Plan that is reviewed on an annual basis to ensure incorporation of new developments and ensure consistencies with best practices.

To provide an evaluated Plan that is sufficiently clear and comprehensive to ensure operational viability.

1.2 Overview of the Canadian Pandemic Influenza Plan

Pandemic contingency planning activities in Canada began in 1983. The first detailed draft of a plan, then referred to as the *Canadian Contingency Plan for Pandemic Influenza*, was completed in 1988; there have been several drafts since then. The latest plan, now referred to as the *Canadian Pandemic Influenza Plan* (the Plan), targets a wide range of people who will be involved in planning and responding to an influenza pandemic; emergency responders, health planners, health care workers, public health laboratories, as well as those involved in the manufacture, registration and supply of pharmaceuticals. However the primary audience for this plan are the provincial and territorial (P/T) Ministries of Health, as the provision of health care and essential services is the jurisdiction of the provinces and territories.

The Plan consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Using this framework the types of planning and response activities needed for comprehensive pandemic planning can be summarized as follows:

- ***Prevention*** activities might be classified as planning actions to ensure that all existing or known or unavoidable risks are contained. Immunization with vaccines is the primary means of prevention and forms the basis of the pandemic response in Canada and many other countries. The annual vaccine infrastructure is the building block utilized to develop this pandemic vaccine response. A second component of prevention is mitigation – consequence management. These types of activities are undertaken to ensure that the consequences of a pandemic remain manageable and do not escalate beyond a control situation.
- ***Preparedness*** activities include preparing the actual plans, training, simulation exercises to pre-test the plans, communications and other interfaces to inform the public and other stakeholders.
- ***Response/Implementation*** of the plans, tested or untested, is the step where activities are directed to controlling the pandemic and repressing direct outcomes (mortality, morbidity due to influenza) and indirect associated effects (social disruption). It is the focus of the Response Section of the Plan and would involve a series of escalating and potentially varying (but harmonized) responses as the pandemic unfolds across the country. Implementation also involves documenting activities and outcomes to determine if a more extensive response is required or whether adjustments to the planned response are necessary.
- ***Post-Event Recovery/After Care*** activities may start at different times across the country as the pandemic waves move through the various jurisdictions. These activities involve the organization of post-event activities to ensure restoration. Dismantling of alternative care sites, phasing out of alternate care workers, and the commencement of new services that may be required to address the impacts are examples of these types of activities. Activities would continue through the declaration of the end of the pandemic in Canada until the pre-pandemic status is restored.

The Preparedness Section of the Plan addresses prevention and preparedness activities during the inter-pandemic period. This section is the result of work that began after the first national meeting on federal, provincial, territorial and local planning held in January 2000 and is based on the deliberations of a number of pandemic influenza working groups, as well as the input of other stakeholder groups and organizations. The purpose of this section of the Plan is to provide information and guidelines that can be used in the development of plans for federal, provincial and territorial (F/P/T) and local management of an influenza pandemic.

In the Preparedness Section, each component for a comprehensive pandemic influenza plan including, surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications, has been addressed in terms of current status, including outstanding issues, planning principles and assumptions. A list of potential planning activities in the form of a checklist has also been included.

The Response and Recovery Sections of the Plan were developed through a collaborative process between the Centre for Infection Disease Prevention and Control (CIDPC) and the Centre for Emergency Preparedness and Response (CEPR), Population and Public Health Branch (PPHB), Health Canada. The Response Section of the Plan will address the operational activities for an effective national response, including essential F/P/T coordination. The Recovery Section will provide guidance on the coordinated post-event activities for the health and emergency response sectors.

This, the Introduction Section together with the Background Section of the Plan is designed to provide the conceptual and historical basis for the Plan and highlight over-arching principles, such as roles and responsibilities and terminology that will be referred to throughout the plan and annexes.

1.3 Roles and Responsibilities

A coordinated response to pandemic influenza requires collective infrastructures, response capacities and coordinated activities that will permit the F/P/T Ministers of Health and their representatives to anticipate problems, monitor for adverse outcomes and respond to minimize the impact of pandemic influenza within their jurisdictions.

The roles and responsibilities of the Pandemic Influenza Committee (PIC) and the F/P/T Ministers of Health were detailed in a Working Agreement between Deputy Ministers of Health in March, 2001.The Working Agreement is an iterative document which allows for roles and responsibility components to be adapted or added as they are developed. The sections that follow include updated excerpts from the Working Agreement that detail the roles and responsibilities for PIC (i.e., the joint F/P/T responsibilities), the federal government, and the provincial and territorial governments.

In general the roles and responsibilities of the respective jurisdictions are as follows:

- The federal government holds responsibility for the nationwide coordination of the pandemic influenza response, including surveillance, international liaison, and coordination of the vaccine response (infrastructure procurement, vaccine allocation, management and funding).
- Joint responsibilities of the F/P/T MOHs include ensuring distribution of plans to all organizations that may be involved in the pandemic response and liaison with these partners on an ongoing basis. They may also be involved in planning simulation exercises once plans are in place. Development of cost estimates and options for decision makers will also be a joint F/P/T responsibility.
- The P/Ts hold responsibility for mobilizing their contingency plans and resources. Health emergency response commences at the local level and escalates through P/Ts to the federal order of government.
- Local public health authorities are responsible for planning the local response to a influenza pandemic with direction from both the P/T and federal level. This involves liaising with local partners (e.g., emergency responders, hospitals, mortuary services) in advance of a pandemic to facilitate a coordinated response when pandemic influenza strikes in the community. It is likely that the local public health authorities, through existing or enhanced surveillance, may be the first ones to detect influenza in their community. It is essential that the lines of communication within the community and up the line to the P/T and federal levels are clear and established in advance of a pandemic.

1.3.1 The Pandemic Influenza Committee

The PIC is a F/P/T committee that first met by teleconference in March 2002. It is co-chaired by two individuals representing the federal and the provincial/territorial governments. The PIC is supported by the CIDPC and reports through the Advisory Committee on Population Health and Health Security (ACPHHS) to the F/P/T Deputy Ministers of Health during the pre-pandemic period. It is anticipated that PIC will report directly to the F/P/T Ministers of Heath at such time when PIC is asked to consult on a real, actual or perceived threat of pandemic influenza. The PIC would continue to report to said F/P/T Ministers of Health until such time as the threat or influenza pandemic is declared over.

The mandate of the PIC includes providing advice, expertise and recommendations, liaison and other activities associated with the pre-pandemic, pandemic and post-pandemic phases to support the health and safety mandates of all orders of government. PIC will also provide advice, assistance and expertise concerning the development, maintenance, testing and evaluation of the Canadian Pandemic Influenza Plan, and when requested to do so, any P/T contingency plan.

1.3.2 The Pre-Pandemic Period

Joint F/P/T Responsibilities

- developing, maintaining and enhancing routine surveillance activities for influenza and other related disease factors/events that are required, including adverse influenza vaccine and antiviral drug reactions;
- developing and maintaining coordinated communication strategies, plans and frameworks during the inter-pandemic period for use during pandemic periods;
- nominating their respective representatives to the PIC;
- developing and participating in coordinated training and simulation exercises, including the coordination of emergency and contingency plans, designed to achieve emergency preparedness and to test, assess, evaluate and adjust pandemic influenza response capacity;
- mobilizing required resources (e.g., medical, scientific, technical, emergency response and other resources, etc.) within their respective jurisdictions to respond to the influenza pandemic in the context of the CPIP;
- developing negotiation and indemnification strategies with Public Works and Government Services Canada to require through the contracting process that manufacturers/fabricators/suppliers provide indemnification or purchase commercial insurance coverages suitable to provide protection, particularly at the time of an influenza pandemic; and
- stockpiling essential emergency supplies that might be routinely and ordinarily associated with the planning and preparation for an influenza pandemic (e.g., mobile hospital beds, syringes, etc.); and
- developing and maintaining the CPIP.

In addition, the Federal Minister of Health through Public Works and Government Services Canada, and the P/T Ministers of Health are responsible for:

- identifying inter-pandemic and pandemic period manufacturers/fabricators/suppliers of influenza vaccine and antiviral drugs, as the case may be; and
- developing contracts with manufacturers/fabricators/suppliers, and coordinating and maintaining a secure supply of influenza vaccines and antiviral drugs for the pandemic period.

PIC Responsibilities

- identifying and/or developing a framework for evaluating the process and the outcome of the individual and the collective responses of all parties to an influenza pandemic;
- drafting safety and performance evaluation criteria against which to evaluate the activities of all parties and their handling of pandemic influenza;
- coordinating preparatory activities;
- providing expertise, advice and recommendations concerning public health, care and treatment, microbiology, immunology, epidemiology, and ethics including:
  - ongoing and timely medical, scientific and public health advice;
  - review of the pandemic influenza response capacity;
  - modifications to pandemic influenza surveillance activities or special studies/investigations to be carried out by the parties and estimating resulting costs;
  - equitable allocation of available influenza vaccine during a pandemic; and
  - policy issues requiring immediate resolution and referring them to the F/P/T Ministers of Health.

Federal Responsibilities

- entering agreements and arrangements with international organizations such as the WHO to support surveillance; coordination and investigation activities;
- producing, allocating, and overseeing the distribution of specialized diagnostic reagents and technical information to provincial and territorial public health laboratories;
- receiving and characterizing viral isolates and sending representative strains to the US CDC, a WHO collaborating centre;
- providing liaison with the CDC and the WHO for influenza surveillance and epidemiology, including issues related to laboratory diagnostic methods and the typing of strains;
- designing, organizing and supporting special national studies required to better define burden of disease or evaluate pandemic influenza response capacity;
- pursuant to Federal legislation, for licensing establishments and influenza vaccines and antiviral drugs for sale;
- instructing manufacturers/fabricators/suppliers pursuant to contractual provisions to obtain, from time to time, appropriate quantities of a specified seed virus identified by the WHO for the purpose of manufacturing domestic and/or off-shore influenza vaccine supplies;

- assisting in the identification of alternative potential sources of influenza vaccines, as required;
- instructing Public Works Government Services Canada (Canada's federal procurement arm) that administrative contractual services be provided to acquire influenza vaccine and antiviral drugs for the pandemic period;
- making reasonable efforts to enter into agreements with foreign governments and or international agencies that have sources of influenza vaccine supply in order to enhance the protection of Canadians during an influenza pandemic by identifying secure supplies of influenza vaccine and antiviral drugs during interpandemic periods;
- providing administrative support for PIC;
- developing and maintaining the Canadian Pandemic Influenza Plan;
- assisting in the planning for international coordination of influenza vaccine supplies during an influenza pandemic and consulting with P/T Ministers of Health on the potential impact of this activity on their influenza vaccine supply;
- enabling the establishment of a national (i.e., domestic) influenza vaccine capacity for pandemic needs of an amount up to 8.0 million doses per month, including ongoing monthly supply of fertilized hens' eggs needed for egg-based component of this capacity;
- making available influenza vaccine and antiviral drugs for specific populations (e.g., military, RCMP, First Nations, and others), and coordinating with P/Ts in the distribution and administration of influenza vaccine and antiviral drugs to those specific populations; and
- acting as lead Federal authority on this health matter, to involve all other appropriate Federal Ministers (e.g., Defence, Finance, Citizenship and Immigration, etc.) in effecting an emergency response.

P/T Responsibilities

- providing Influenza prevention, treatment and control consistent with policies and procedures within their jurisdictions, including the distribution of influenza vaccine and antiviral drugs;
- coordinating with the Federal government about the distribution of influenza vaccine and antiviral drugs to First Nations and military and RCMP personnel;
- ensuring that their respective pandemic influenza contingency plans are developed and adopted and that these contingency plans and appropriate guidelines are regularly updated;
- participating in national surveillance activities by monitoring and reporting diseases caused by influenza virus and related diseases/conditions, and use their best efforts to take steps within their authority to cooperate with the Federal Minister of Health and PIC with regard to national surveillance activities;
- maintaining provincial and territorial surveillance activities, including, the isolation, antigen detection, serology, and strain identification for influenza viruses and the participation in Influenza proficiency tests;
- investigating outbreaks and clusters of influenza-like illness;
- sending influenza virus isolates and reporting the extent of influenza-like illness to Health Canada;

- designing, organizing and supporting special studies of provincial or territorial focus required to better define burden of disease or evaluate pandemic influenza response capacity;
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that they have accepted and that fall within their scope of responsibilities as identified in the Working Agreement;
- undertaking promotional and other activities to decrease annual morbidity and mortality due to Influenza;
- acting as lead authorities in their respective jurisdictions on this health matter, to involve all other appropriate P/T Ministers in effecting an emergency response; and
- undertaking periodic reviews of immunization prioritization schemes for influenza vaccines and antiviral drugs.

1.3.3 The Pandemic Period

Joint F/P/T Responsibilities

- monitoring, reviewing and assessing any issues where immediate intervention may be required to ensure the health and safety of Canadians;
- ordering influenza vaccine and antiviral drugs and considering the need for, and ordering if necessary, any additional influenza vaccine in preparation for a second wave of pandemic influenza;
- refining coordinated and targeted communication strategies to keep the public, health professionals and any other persons or groups informed particularly in regards to the influenza pandemic and the recommendations on the use of influenza vaccines and antiviral drugs;
- disseminating communication and educational information concerning the first and second waves of the influenza pandemic and providing communication and educational information concerning the potential for a second wave of pandemic influenza; and
- deactivating their respective contingency plans for pandemic influenza.

PIC Responsibilities

- confirming that the conditions, based on an independent assessment of the information/intelligence and not necessarily subject to a declaration by the WHO, for an influenza pandemic have been met and recommending to the F/P/T Ministers of Health that contingency plans for pandemic influenza be activated;
- recommending vaccine composition, number of doses, priority groups to receive influenza vaccine and antiviral drugs, standards or acceptable rates for adverse influenza vaccine and antiviral drug reactions, mechanisms and time frames for reporting, the equitable distribution of available products to prevent or treat pandemic influenza, modifications to Influenza surveillance and communications strategies;
- assessing influenza vaccine coverage, disease impact, making recommendations concerning vaccine composition and updating guidance concerning use, and equitable distribution of influenza vaccines;

- taking into account influenza vaccines and antiviral drugs that may remain following the first and second waves of the influenza pandemic and making recommendations concerning their alternate use and redistribution;
- recommending enhanced surveillance and targeted studies to better monitor and define the influenza pandemic in Canada, and refine safety and performance evaluation criteria;
- proposing or developing criteria that can be used by itself or others to assist in the post pandemic evaluation of recommendations concerning processes and outcomes during the influenza pandemic; and
- recommending the influenza pandemic be declared over.

Federal Responsibilities

- declaring the activation of the pandemic phase of the CPIP;
- providing liaison with other countries and international organizations;
- allocating scarce influenza vaccine on an equitable basis to P/T based on the recommendations of PIC;
- collaborating with other government departments, in consultation with *Emergency Preparedness Canada* now known as the *Office of Critical Infrastructure and Protection and Emergency Preparedness* to activate emergency response teams (e.g., RCMP, military, others) as required;
- communicating on an urgent basis with P/T Ministers of Health to resolve any urgent policy and operational issues identified by PIC or others that will impact any pandemic influenza response capacity; and
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that fall within the federal scope of responsibilities set out in the Working Agreement.

P/T Responsibilities

- activating, operationalizing and/or implementing their respective contingency plans; and
- communicating on an urgent basis together with their federal colleague to resolve any urgent policy and operational issues identified by PIC or others that will affect any pandemic influenza response capacity.

1.3.4 The Post-Pandemic Period

Joint F/P/T Responsibilities

- reviewing, evaluating and taking measures to improve or enhance their respective roles following the conclusion of an influenza pandemic; the pandemic influenza response capacity; and collaborative research activities.

PIC Responsibilities

- recommending post-pandemic studies to assist in evaluations of the pandemic influenza response capacity including, any medical, scientific and technical aspects; and submitting to F/P/T Ministers of Health a report together with its recommendations for future pandemics.

Section Two

BACKGROUND

2.1 Epidemiology of Pandemic Influenza

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. A pandemic can occur at any time, with the potential to cause serious illness, death and colossal social and economic disruption throughout the world. Experts agree that future influenza pandemics are inevitable but the timing of the next pandemic cannot be predicted. Since there may be little warning, contingency planning is required to minimize the devastating effects of a pandemic.

Historic evidence suggests that pandemics occurred three to four times per century. In the last century there were three influenza pandemics ("Spanish flu" in 1918–19; "Asian flu" in 1957–58 and "Hong Kong flu" in 1968–69), separated by intervals of 11 to 44 years. The worst, in 1918–19, killed an estimated 30,000 to 50,000 people in Canada and 20 to 40 million people worldwide. During each of the last three pandemics, the greatest increase in death rates occurred among persons less than 60 years of age; in 1918–19, the greatest number of deaths occurred in those 20 to 40 years of age.

Certain conditions make an influenza pandemic more likely:

- a new influenza A virus arising from a major genetic change i.e., an antigenic shift;
- a susceptible population with little or no immunity;
- a virus that is transmitted efficiently from person to person; and
- a virulent virus with the capacity to cause serious illness and death.

It is thought that new influenza viruses capable of causing pandemics in human populations arise through genetic mixing (reassortment) between human and avian influenza viruses. Pigs, which can be infected with both human and avian influenza viruses, may act as vehicles for such reassortment events. However, in 1997 direct transmission of avian H5N1 influenza from chicken to humans was demonstrated in the Hong Kong "bird flu" incident, indicating that contact with pigs is not essential for human infection with an avian virus. The majority of new influenza strains emerge in Southeast Asia where large human populations have close interactions with pigs and domestic fowl. The probability of a new strain emerging in North America is thought to be relatively low.

Based on the last two pandemics, it is estimated that the next pandemic virus will be present in Canada within three months after it emerges in another part of the world, but could be much sooner due to increases in the volume and speed of global air travel. Upon arrival, the virus may spread across Canada with great speed. In 1918, returning soldiers with influenza traveling on trains carried the virus from Quebec to Vancouver within a few weeks. The first peak of illness in Canada may occur within 2 to 4 months after the virus arrives in Canada. The first peak in mortality is expected to be approximately one month after the peak in illness. Based on past pandemics, in temperate climates when the pandemic virus arrives close to the usual annual influenza season (November to April) the interval from the arrival of the virus to the height of the epidemic can be very short.

In addition, it has been observed that an influenza pandemic usually spreads in two or more waves, either in the same year or in successive influenza seasons. A second wave may occur within three to nine months of the initial outbreak wave and may cause more serious illnesses and deaths than the first. In any locality, the length of each wave of illness is likely to be six to eight weeks.

2.2 Estimated Impact of an Influenza Pandemic on Canadians

The impact of the next influenza pandemic is difficult to predict, and is dependent on how virulent the virus is, how rapidly it spreads from population to population, and the effectiveness of prevention and response efforts. Despite the uncertainty about the magnitude of the next pandemic, estimates of the health and economic impact remain important to aid public health policy decisions and guide pandemic planning for health and emergency sectors.

During "normal" influenza epidemics which occur almost every winter in North America, an average of 5% to 20% of the population becomes ill, but as high as 30% to 50% of the population may become ill during severe influenza A epidemics. The highest rates of infection and clinical illness occur in children but serious complications and death occur mainly in the elderly. During a pandemic, historic data shows that over 50% of a population may become infected with the novel virus and the age-specific morbidity and mortality may be quite different from the annual epidemics with a higher proportion of deaths in persons under 65 years of age. In 1918–1919 pandemic, young adults had the highest mortality rates, with nearly half of the influenza-related deaths occurring persons 20-40 years of age. During the 1957–1958 and 1968–1969 pandemics in the U.S., persons under 65 years of age accounted for 36% and 48% of influenza-related deaths respectively.

An estimate of the health and economic impact of a pandemic in Canada has been performed using a model developed by Meltzer and colleagues, CDC, Atlanta, (available at http://www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm) with assumptions based on U.S. epidemiologic data on various population health outcomes (death, hospitalization, outpatient treatment, and ill but no formal care) for severe influenza A epidemics, and data from previous pandemics. The model does not include the potential impact of antivirals drugs or an effective vaccine. These estimates may over- or under-estimate the potential impact in Canada; they are being provided for planning purposes only and to raise awareness regarding a very real possibility.

Based on the model an estimated 4.5 to 10.6 million Canadians would become clinically ill such that they would be unable to attend work or other activities for at least a half a day (Figure 1). This proportion, representing 15% to 35% of the population, does not include individuals who contract the virus and feel ill, but continue their usual activities. In addition, it is estimated that between 2.1 and 5.0 million people would require outpatient care, between 34 thousand and 138 thousand people would require hospitalization and between 11 thousand and 58 thousand people would die in Canada during an influenza pandemic (Table 1). These numbers are estimates and do not take into account the differences in the health care systems, practice patterns and health care seeking behaviour in Canada as compared to the U.S., nonetheless, they provide a picture of the magnitude and potential impact of the next influenza pandemic.

Figure 1
Estimated impact of Pandemic Influenza in Canada

4.5 to 10.6 Million - clinically ill (i.e., unable to attend work for at least half a day)

2 to 5 Million - require outpatient care

34,000 to 138,000 - require hospitalization

11,000 to 58,000 - deaths

Canadian estimates of resource use for patients with these health outcomes and Canadian resource unit costs were applied to provide and estimate of Canadian costs based on this American model. The economic impact (direct and indirect) on the health care system is estimated to be between 10 to 24 billion dollars.

Table 1
Estimated number of cases by outcome

Outcome	Attack Rate 15%			Attack Rate 35%		
	Mean number	5th Percentile	95th Percentile	Mean number	5th Percentile	95th Percentile
Death	17,768	10,544	24,954	41,459	24,603	58,227
Hospitalization	46,639	34,042	59,166	108,824	79,431	138,053
Outpatient Care	2,086,327	2,027,496	2,145,282	4,868,097	4,730,825	5,005,657
Ill, no formal care	2,394,443	2,335,458	2,455,967	5,587,035	5,449,401	5,730,591
TOTAL	4,545,177	4,407,545	4,685,464	10,605,415	10,284,265	10,932,623

2.3 Terminology

2.3.1 Pandemic Phases

The World Health Organization (WHO) pandemic influenza phases (http://www.who.int/emc-documents/influenza/whocdscsredc991c.html) will be used throughout the Plan to assist with the organization of the staged response activities. This common terminology will facilitate communication especially for joint planning and response efforts between Canada, the U.S., and international stakeholders. Once a pandemic has began, different regions of the world may experience different phases at any given time.

For communication purposes the term "Canadian Pandemic Phase" may be used to denote the WHO phase which corresponds to the situation in Canada. Since it is unlikely that the novel influenza strain will first emerge in Canada, it is important to recognize that the declaration of the pandemic in Canada (Phase 1) will most likely occur some time after WHO Phase 1. Once Canada is affected, different communities may move through the phases at different times and rates, however the Canadian Pandemic Phase will continue to refer to the overall national situation.

Table 2 below describes the WHO phases.

For planning purposes, Phase 0 (Preparedness Levels 0 to 3) is considered to be the "interpandemic" period, Phases 1-4 correspond to the "pandemic period" and Phase 5 is the "post-pandemic" period.

Table 2
Pandemic Phases

WHO pandemic phase (and abbreviated description)	Description
WHO Phase 0, Level 0 Inter-Pandemic	› No indications of any novel virus subtype have been reported
WHO Phase 0, Level 1 Novel virus identification in a human	› Novel virus detected in a person › Little or no immunity in the general population › Potential, but not inevitable precursor to a pandemic
WHO Phase 0, Level 2 Human infection confirmed	› Confirmation that the novel virus has infected two or more persons, indicating that the virus is infectious for humans
WHO Phase 0, Level 3 Human-to-Human Transmission Confirmed	› Novel virus demonstrates sustained person-to-person transmission with at least one outbreak over at least a two-week period in one country, or identification of the novel virus in several countries

WHO pandemic phase (and abbreviated description)	Description
WHO Phase 1 Pandemic confirmed	› WHO declaration of pandemic occurs when the novel virus is causing unusually high rates of morbidity and/or mortality in multiple, widespread geographic areas (Note: This is likely to occur in Canada after the WHO declaration of a pandemic but may occur sooner if the novel virus emerges in Canada or is rapidly imported after its emergence outside Canada)
WHO phase 2 Outbreaks in multiple geographic areas	› Further spread of the virus with outbreaks reported in multiple geographic areas, resulting in the first peak of morbidity and mortality
WHO phase 3 End of first wave	› End of first wave when influenza activity has stopped or reversed in initially affected areas
WHO Phase 4 Second or later waves	› Recrudescence of outbreaks caused by the pandemic virus (within three to nine months in past pandemics) following the initial wave of infection; may affect different segments of the population
WHO Phase 5 Post-Pandemic / Recovery	› Return of the seasonal "epidemic" cycle with major disease impact on the elderly and very young

2.3.2 List of Abbreviations

ACPHHS	› Advisory Committee on Population Health and Health Security
CCRA	› Canadian Customs and Revenue Agency
CDC	› Centres for Disease Control and Prevention
CEPR	› Centre for Emergency Preparedness and Response
CIDPC	› Centre for Infectious Disease Prevention and Control
CMOH	› Chief Medical Officer of Health
CPIP	› Canadian Pandemic Influenza Plan
CSIS	› Canadian Security Intelligence Service
DND	› Department of National Defence
EOC	› Emergency Operations Centre
ERAP	› Emergency Response Action Plan
ERP	› Emergency Response Plan
F/P/T	› Federal/Provincial/Territorial

HERT	› Health Emergency Response Team
JBCRT	› Joint Biological Chemical Response Team
JTF2	› Joint Task Force 2
MOH	› Medical Officers of Health
NACI	› National Advisory Committee on Immunization
NBC	› Nuclear, Biological, Chemical
NESS	› National Emergency Stockpile System
NML	› National Microbial Laboratory
NML4	› National Microbial Laboratory Level 4
OCIPEP	› Office of Critical Infrastructure and Protection and Emergency Preparedness
PAHO	› Pan American Health Organization
P/T	› Provincial/Territorial
QTMH	› Quarantine, Travel and Migration Health
RCMP	› Royal Canadian Mounted Police
VAER	› Vaccine Adverse Events Reporting
WHO	› World Health Organization

2.4 Legal Considerations

The legal considerations linked to pandemic preparedness and response are complex, and need to take into account the existing federal legislation as well as legislation in the 13 provinces and territories.

In order to provide an informed and objective examination of these issues, Health Canada commissioned the services of several independent third parties to explore the key issues. One of the deliverables provides an overall legal framework within which the Canadian Pandemic Influenza Plan applies, others looked specifically at 1) patent, contract, tort and insurance issues and 2) labour and employment law issues. The legal considerations identified by the consultants will be considered in the next draft of the Plan.

2.5 Ethical Considerations

As part of the development of the latest version of the Plan, Health Canada, contracted an ethicist to provide "external" advice on some of the problematic ethical and related issues that have emerged as each of the planning components have been examined.

As a result of this process a report was generated that " *attempts to identify relevant ethical principles, rules and values, to develop a reasoned position on some previously articulated and morally problematic measures, and identifies some other moral concerns and questions raised by the planning activities. The report takes the position that the proper initial objective of planning for influenza response is to identify all measures that can diminish as much as possible the impact of the pandemic on our whole population and to assess the benefits and burdens, (including the costs) of these measures*".

The ethical considerations identified by the consultant, such as those surrounding the allocation or prioritization of scarce resources, are continuing to be considered in the next draft of the Plan.

Section Three

PREPAREDNESS

3.1 Introduction

3.1.1 Background

This document, the *Preparedness Section of the Canadian Pandemic Influenza Plan*, addresses prevention and preparedness activities during the inter-pandemic period. It is based on the deliberations of a number of pandemic influenza working groups, as well as the input of other stakeholder groups and organizations.

The national working groups and sub-committees, addressed specific issues in the Plan and developed the guidelines and reference documents annexed in the Plan. The current working groups include Surveillance, Vaccines, Antiviral Drugs, Public Health Measures, Communications and Health Services. Each annexed document has been created to address specific issues related to the overall goal of minimizing serious illness and overall deaths, and secondly, minimizing societal disruption among Canadians as a result of an influenza pandemic. The annexes were based on the data available and prevailing beliefs and approaches to pandemic planning at the time they were written; they may be updated separately as needed to ensure that they remain current and realistic.

The purpose of this section of the Plan is to provide information and guidelines that can be used in the development of plans for federal, provincial and territorial (F/P/T) and local management of an influenza pandemic.

3.1.2 Populations under Federal Jurisdiction

Across Canada, various federal departments and agencies provide a varied range of health services to a number of "populations". These "populations" (e.g., First Nations reserves, large military bases, federal prisons) could potentially cause a unprecedented increase in demand for health services in local health regions during a pandemic. Advanced planning is required to ensure that all P/Ts and regions in close proximity to these populations in addition to the appropriate federal authorities have agreed upon roles and responsibilities in the event of a pandemic.

The current status, outstanding issues and next steps for coordinated planning for First Nations communities will be addressed in Annex B (which is currently being revised). Federal level discussions have been initiated to ensure that the needs of other populations under federal jurisdiction are also addressed within the context of a co-ordinated pandemic response. These activities should not preclude discussions at the P/T and local level where many of the issues may have already been raised.

3.2 Components of the Preparedness Section

To date, the components of the Pandemic Influenza Plan have included surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications. Each of these components have been addressed in this section in terms of current status, including outstanding issues, and planning principles and assumptions. A list of potential planning activities has also been included.

It has been recommended that in order to make the Plan more comprehensive and similar in scope to other emergency plans, a component focusing on psycho-social issues should be added. It is anticipated that this new component will be developed and incorporated into future versions of this plan. In the interim, provincial/territorial and local planners are encouraged to think about the psycho-social implications of pandemic influenza when developing their own plans both in terms of preparedness and response activities.

3.2.1 Surveillance

Influenza surveillance is required to determine when, where, and which influenza viruses are circulating; the high risk populations; the intensity and impact of influenza activity; and to detect unusual events (e.g., infection by unusual influenza viruses, unusual syndromes caused by influenza viruses, and unusually large or severe outbreaks of influenza). Both virologic and disease surveillance are necessary for identifying influenza virus variants and for determining their ability to spread and cause disease. Surveillance data will drive the pandemic response as it will be used to determine the pandemic phase, and to track progression through the phases.

Laboratory surveillance involves the isolation of influenza viruses for analysis of antigenic and genetic properties. This activity is essential for monitoring the antigenic drift and shift of influenza viruses circulating among humans. Because the signs and symptoms of influenza are similar to those caused by other respiratory pathogens, laboratory testing must be conducted to definitively diagnose influenza. Rapid identification of a novel influenza virus and timely tracking of virus activity throughout the duration of the pandemic is critical to the success of a pandemic response. Prompt identification of a novel strain increases lead time for the development of a vaccine and implementation of prevention and control measures.

The collection of epidemiologic data regarding influenza-like illness (ILI) and influenza related hospitalizations and deaths is essential for determining the extent and severity of influenza epidemics and is particularly important during epidemics or pandemics associated with a newly recognized influenza variant. Epidemiologic data will help guide prevention and control strategies (e.g., the prioritization of limited vaccine supplies).

The objectives of Influenza surveillance are:

- to provide data on currently circulating strains and facilitate comparison with vaccine composition and vaccine recommendations,
- to describe the affected population thereby facilitating identification of high risk groups and comparisons between other populations or other influenza seasons,
- to detect unusual events including unusual or new strains, unusual outcomes/syndromes, or unusual distribution or severity of the disease within the population,
- to inform the pandemic response during a pandemic by tracking occurrence and progression of the pandemic through the population (by WHO phase).

3.2.1.1 Current Status

The current national influenza surveillance system, "FluWatch", incorporates data from several sources including a sentinel physician network conducting surveillance for ILI, data from the national network of laboratories, and provincial/territorial activity level reporting. Laboratory data is provided on a weekly basis year-round.

On an ongoing basis, the national Respiratory Infections Surveillance Committee (previously known as the Surveillance Working Group) assesses the surveillance system, considers global influenza activity and makes recommendations to ensure preparedness for an influenza pandemic. One recommendation included the maintenance of national surveillance throughout the year to detect the arrival of novel influenza strains outside of the typical influenza season in Canada. This was implemented in 2003, when year-round surveillance began through the Fluwatch program, including the sentinel physicians network and the provincial and territorial Fluwatch representatives, in addition to the already year-round laboratory reporting through the Respiratory Virus Detections System. Thus year-round influenza surveillance presently consists of weekly reporting during the typical influenza season (October through April) and biweekly reporting during the typical "off season" (i.e., May to September).

As a result of the SARS outbreaks in early 2003, recommendations for the expansion of respiratory surveillance activities to include hospital-based surveillance for 1) unexplained clusters of severe respiratory illness within the facility, and 2) individual cases of severe respiratory illness in travellers recently returning from a potential zone of emergence of novel influenza strains, are also being implemented.

Other recommendations include improving the surveillance capacity to enable rapid assessment of the epidemiology of the pandemic once it arrives. Specifically this may include emergency room surveillance for ILI and unusual death due to respiratory disease, provisions for real-time influenza and pneumonia mortality surveillance and improved linkages between the sentinel and laboratory surveillance systems. In addition, there is a need to enhance laboratory-based surveillance including laboratory testing capacity and standardization of testing protocols. Once developed by the sub-group on Laboratory Testing, these will be shared with all appropriate laboratories. The Sub-group on Laboratory Testing has developed laboratory guidelines for pandemic planning and preparedness (Annex C).

The need to implement new initiatives, timing and feasibility will remain on the agenda of the Respiratory Infections Surveillance Committee. Recommendations from this group will be distributed through P/T representatives and will identify action items for the CIDPC and initiatives that should be considered for support by P/T and local governments.

The need for development of special study protocols that can be activated at the time of a pandemic (e.g., surveillance of returning travelers from areas affected by the pandemic virus) has been recognized by the committee and currently remains an outstanding issue.

At the federal level, regular environmental scanning for the detection of potentially significant influenza-like illness is conducted using official information sources for influenza surveillance (e.g., WHO and international government influenza surveillance programs) as well as unconfirmed reports from early warning systems (e.g., ProMed and other media scanning software such as the Global Public Health Intelligence Network (GPHIN). However, the sustainability of these systems, investigation and dissemination of information from these systems, and the streamlining of these processes to maximize efficiency, remains an outstanding issue.

3.2.1.2 Planning Principles and Assumptions

Since surveillance data will drive the pandemic response it is important that physicians and other health care workers are educated and updated on an ongoing basis about the importance of ILI surveillance and their role in the system. Surveillance systems must be established in advance of a pandemic as there will be little time to augment capacity at the time of a pandemic. At the time of a pandemic, surveillance and laboratory testing capacity will be reduced (e.g., due to staff absenteeism and supply shortages) as compared to pre-pandemic periods, and only streamlined, resource efficient systems will continue to function. Special study protocols if required, (e.g., to determine epidemiology or to investigate reported vaccine-associated adverse events) at the time of a pandemic must be developed and pre-tested in the pre-pandemic period, recognizing that refinements may be necessary at the time of a pandemic.

The intensity and methods of virologic surveillance will differ depending on the phase of the pandemic. Initially, efforts should be directed toward detecting the arrival of the novel virus into previously unaffected areas and collecting epidemiologic data on infected persons. This data will be used to characterize virus activity and better target prevention and control measures. In addition, arrival of the novel virus into a particular area will guide the mobilization of resources needed to implement control measures. After the virus has spread throughout the country, virologic surveillance must continue in order to track the intensity of virus activity and detect any changes in the virus, including the development of resistance to antiviral drugs in different populations. Targeted studies may include serologic studies of immunity to the virus in different populations.

Studies of the etiologic agents responsible for secondary complications of influenza and their susceptibility to antimicrobial drugs will also be important, especially in times of short supply. In addition, surveillance data and targeted studies will be useful in assessing the impact of the pandemic on the health care system, as well as social and economic impact.

3.2.2 Vaccine Programs

Vaccination of susceptible individuals is the primary means to prevent disease and death from influenza during an epidemic or pandemic. The National Advisory Committee on Immunization (NACI) produces annual recommendations on the use of influenza vaccine in persons who are most at risk for influenza or those who could spread influenza to persons at greatest risk. These interpandemic recommendations are published annually in the Canada Communicable Disease Report. In the event of a pandemic, the Pandemic Influenza Committee, which includes representation from NACI, will provide recommendations to

F/P/T immunization programs on the use of the pandemic vaccine and priority groups for immunization. Efforts should be made to encourage all jurisdictions to adopt the national recommendations on priority groups at the time of a pandemic in order to facilitate equitable access and consistent messaging.

The objectives of the Pandemic Vaccine Program are:

- to provide a safe and effective vaccine program to all Canadians as soon as possible;
- to allocate, distribute and administer vaccine as rapidly as possible to the appropriate groups of people;
- to monitor safety and effectiveness of vaccination programs.

3.2.2.1 Current Status

The annual influenza vaccine available in Canada is a trivalent vaccine, composed of two influenza A subtypes and one influenza B subtype. The vaccines contain 15 micrograms of hemagglutinin antigen for each constituent strain. For adults and older children previously exposed to viruses similar to those present in the vaccine, a single dose is normally recommended. In children (under the age of nine years) lacking such previous exposure, two doses are recommended.

Currently, Canada uses approximately 10 million doses of trivalent influenza vaccine a year (equivalent to 30 million monovalent doses of 15 micrograms), delivered predominantly through publicly-funded programs with established vaccine delivery infrastructures. Provinces and territories vary in their target populations for annual influenza programs, with the majority providing vaccines to NACI recommended high risk groups. Some provinces and territories have expanded their programs to include populations not currently identified as high risk groups (e.g., the Ontario "universal" program) and have experience in conducting large influenza vaccination campaigns.

The vaccine typically becomes available in October of each year and is currently provided by two suppliers. Annual influenza immunizations are administered in a variety of setting across Canada, including physicians' offices, public health clinics at schools or other community settings, workplace clinics, and other settings including pharmacies.

The Canadian approach to vaccine procurement and supply contingency planning includes the development of domestic infrastructure, a standby supply of fertilized hens eggs ready to convert into vaccines, the phasing in of new technologies, and further security of supply through multiple suppliers. Confirmatory study (clinical trial) protocols will be developed in order to ensure the most expeditious product licensure process while ensuring safety at the time of a pandemic.

The Vaccines Working Group has made recommendations regarding the priority groups for immunization in the event of a pandemic. These recommendations are discussed in Annex D. In addition, guidelines for planning a mass immunization campaign have been developed by P/T and local jurisdictions and can be adapted for use during a pandemic (e.g., Mass Immunization Campaigns: A 'How To' Guide, Capital Health Region of Alberta, April 2000 and Guidelines to Planning a Mass Immunization Campaign, Waterloo Region Community Health Department, Ontario, January 2001). The Vaccine working group will also develop guidelines for the monitoring of vaccine usage during a pandemic and identify issues around vaccine associated adverse event tracking and liability issues.

With respect to vaccine associated adverse events, the CIDPC maintains a vaccine associated adverse events surveillance system (VAAESS). Reports of adverse events associated with influenza vaccination are monitored through reports from P/T Ministries of Health (approximately 95%), with some being reported by health care professionals and by manufacturers direct to Health Canada (approximately 5%). The reporting is based mainly on voluntary notifications by clinicians and public health nurses. Data on hospitalizations in children possibly associated with vaccination are provided by the network of children's hospitals in Canada that participate in the Immunization Monitoring Program - Active (IMPACT). In addition, acute flaccid paralysis (including Guillain Barré Syndrome) is monitored by the Canadian Paediatric Surveillance Program.

Outstanding issues with respect to vaccine programs include the dose in micrograms required to achieve a protective response to a novel strain in a naive host, whether one or two doses of vaccine will be required, and timing of vaccine availability in conjunction with onset of pandemic activity in Canada. This information is unlikely to be available until the pandemic has begun. Continued international vaccine research efforts are a priority, including clinical studies to evaluate influenza vaccines containing novel subtypes (e.g., H5N3 vaccines) in immunologically naive populations, and the development and evaluation of new vaccine technologies (e.g., non-egg based production technologies, recombinant vaccines and adjuvant vaccines) to increase the capacity to produce an effective pandemic vaccine, reduce the lead time for vaccine production and increase the capacity to vaccinate larger populations.

Another outstanding issue is the development of a plan for equitable distribution of vaccine to provinces and territories. This plan would need to provide clear direction regarding the management of vaccine programs for populations under federal jurisdiction (First Nations, RCMP, Armed Forces & federal penitentiary inmates).

3.2.2.2 Planning Principles and Assumptions

Currently the vaccines available in Canada are inactivated vaccines, manufactured in fertilized hens eggs. This production system is dependent on egg availability, and is characterized by stringent time requirements for identification of vaccine candidate strains, preparation of seed lots, testing and licensing, manufacturing and distribution. Manufacturers require approximately 56 days from seed strain availability to production of the first lot of vaccine for testing. Delays in the production of pandemic vaccine seed strains may occur, as highlighted by the difficulties encountered in trying to produce a vaccine against the H5N1 virus involved in the 1997 Hong Kong outbreak. As a consequence, vaccine may not be available when the first wave of the pandemic strikes Canada.

At the time of a pandemic, it is assumed that monovalent vaccines containing only the pandemic strain will be used. The dosage and schedule of the pandemic vaccine required to induce immunity in different populations must be determined through clinical testing. Where possible, clinical testing with vaccines for novel virus subtypes should be performed in the interpandemic period and confirmatory trial for the specific pandemic vaccine will be carried out at the time of a pandemic. This testing will probably be undertaken outside of Canada through international studies.

At this time, it is assumed that in a pandemic caused by a novel virus subtype, all persons will lack previous exposure and will likely require two doses of vaccine. It is unknown whether two 7.5 microgram doses or two 15 microgram doses or higher dosage will be needed. It is also unknown whether it might be possible to given an initial immunization with a generic vaccine of the correct H type and then give a second dose with the specific antigen. If that is possible, domestic vaccine production and immunization could begin before Canada has the specific strain. Adjuvants could potentially enhance the immunogenicity of influenza vaccines and reduce the amount of antigen required; further research on adjuvanted vaccines is required.

During a pandemic, embargos on vaccine must be anticipated, as countries with production capacity are likely to see such an event as a national health emergency or a threat to national security. Canada has invested in a domestic supplier to offset this possibility. However it will not be known whether this supplier will be able to produce enough vaccine for the entire target population in a timely manner, until vaccine production with the novel strain commences. The possibility of multiple suppliers should be considered in the planning process.

When vaccine becomes available, initial supplies will not be sufficient to immunize the whole population and prioritization for vaccine administration will be necessary. The F/P/T governments will control the allocation and distribution of influenza vaccine during a pandemic and will implement specific recommendations regarding priority groups for immunization. Priority groups have been proposed in Annex D; however, these may change when more is known about the epidemiology the pandemic. It is assumed that with a two-dose program, completion of the second dose should be carried out as soon as possible to effect immunity and this should not wait until every priority group has received a first dose. This strategy will require extensive planning involving tracking and recall mechanisms.

In a pandemic, the current aim is to vaccinate the whole Canadian population over a period of four months on a continuous prioritized basis after receipt of the pandemic seed strain . This would require a minimum of 32 million monovalent doses (8 million doses per month). Vaccine clinical trials at the time of a pandemic will be needed to determine the amount of vaccine antigens per dose and the number of doses required to optimize immunity in various age groups. If two doses are needed to achieve protection, either the goal of immunizing the entire population over four months would have to be reassessed or the required quantities would need to be doubled to 16 million doses per month. Vaccine recommendations may not be finalized until pandemic activity has commenced. These recommendations will be distributed as national guidelines as soon as possible, with the expectation that they will be followed in order to ensure a consistent and equitable program.

For vaccine program planning purposes it is important to be prepared to immunize 100% of the population; however the actual proportion of the population that will voluntarily seek vaccination will depend on public perception of risk and severity of the disease. Therefore the demand, manifest as clinic attendance, will likely vary between jurisdictions and within each jurisdiction as the pandemic evolves. Previous experience with outbreak related immunization clinics indicates that it would be prudent to prepare for an initial demand of 75% of the target population. It is recommended that planning activities also focus on delivering a two-dose program to ensure that the public health response is ready to deal with this possibility.

In a pandemic, while immunization activities would be expected to greatly increase, reporting of vaccine associated adverse events through normal channels could be delayed due to reallocation of human resources or staff absenteeism. In this situation, information on potential vaccine associated adverse events must still be communicated in a timely manner from the local to P/T public health authorities and on to the Division of Immunization and Respiratory Diseases, CIDPC. CIDPC may need to contact other government departments (e.g., Biologics and Therapeutic Products Directorate, Public Works and Government Services Canada for the location for alternative suppliers) and stakeholders. Therefore there is a need to establish a plan to monitor vaccine safety and ensure timely communication of any potential vaccine associated adverse events during the pandemic. Specific targeted studies and surveillance activities may be required if an adverse event suspected to be due to the new vaccine is detected.

Clinical trial protocols should be developed in advance of a pandemic and should be updated as needed based on available knowledge on influenza vaccines and changing technologies. Phase 3 clinical trials for vaccine efficacy may not be performed prior to the implementation of vaccine programs at the time of a pandemic. Estimation of vaccine effectiveness may need to be carried out by studying pre-determined target populations during the pandemic. Health Canada will coordinate studies on vaccine effectiveness with P/Ts, researchers and vaccine manufacturers.

In the inter-pandemic period consideration should also be given to improving pneumococcal vaccination coverage levels in NACI recommended "high-risk" groups. *Streptococcus pneumoniae* is a common cause of secondary bacterial pneumonia. The incidence and severity of secondary bacterial pneumonia during the pandemic may be reduced if there is a high level of immunity to the most common serotypes of *Streptococcus pneumoniae* in the high-risk groups.

3.2.3 Antivirals

Vaccines, when available, will be the primary public health intervention during a pandemic. However, vaccine may not be available as soon as required at the start of the pandemic and two doses of vaccine may be necessary to achieve an adequate immune response. Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and may have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response. Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines.

Two classes of antiviral drugs are currently available in Canada and have a role in the prevention and treatment of influenza infection: M2 ion channel inhibitors (cyclic amines) and neuraminidase inhibitors. M2 ion channel inhibitors interfere with the replication cycle of influenza A but are not effective against influenza B. Amantadine and rimantadine are examples of M2 ion channel inhibitors. Zanamivir and oseltamivir are examples of neuraminidase inhibitors. These drugs interfere with replication of both influenza A and B viruses, are well tolerated, and have been used effectively for the prophylaxis and treatment of influenza A and B infections.

Amantadine is approximately 70-90% effective in preventing illness from influenza A infection. When administered within two days of illness onset, it can reduce the duration of uncomplicated influenza A illness by approximately one day but it has not been shown to reduce the complications of influenza. Resistance to Amantadine has been shown to develop rapidly when this drug is used for treatment purposes.

When administered within two days of illness onset, zanamivir and oseltamivir can reduce the duration of uncomplicated influenza A and B illness by approximately one day. Current evidence suggests that the development of resistance during treatment of influenza is less likely with neuraminidase inhibitors than with amantadine. Recent community studies suggest that both neuraminidase inhibitors are similarly effective in preventing febrile laboratory-confirmed influenza illness. Further evidence is needed on the effectiveness of neuraminidase inhibitors in reducing complications of influenza. See Annex E for additional details on these antiviral drugs.

The objectives of the antivirals initiative are:

- to recommend a strategy for the use of antivirals during a pandemic
- to address issues around the security of supply of antivirals;
- to monitor drug resistance during the pandemic;
- to facilitate planning to ensure the distribution of available antiviral drugs to appropriate groups of people during the pandemic.

3.2.3.1 Current Status

Only amantadine is licensed in Canada for both prophylaxis and treatment of influenza A infections. Rimantadine is not currently licensed in Canada and both zanamivir and oseltamivir are licensed for treatment purposes only. Neuraminidase inhibitors are much more expensive than amantadine at this time.

The national Antivirals Working Group has developed strategic options on the use of antivirals during a pandemic, including identification of priority groups. Security of supply is an issue that needs to be addressed as the existing supply of antivirals is very limited in Canada and globally and is primarily distributed within the private sector. It is expected that global supplies of antivirals will be consumed very rapidly at the start of a pandemic. Antivirals are prescribed by individual physicians on a first come first served basis. Prioritization of supplies and distribution and diversion of any available antivirals for public health use during a pandemic remains to be addressed. Other outstanding issues include the development of a protocol for monitoring of drug resistance during the pandemic.

3.2.3.2 Planning Principles and Assumptions

An effective intervention with antivirals will require:

- a secure supply;
- a well planned distribution and monitoring system under the direction of F/P/T governments in collaboration with suppliers;
- ability to target priority groups;
- the availability of rapid diagnostic tests;
- enhanced surveillance for the detection of the virus, resistance of the virus to antivirals and drug associated adverse events;
- clinical guidelines for the appropriate use of antivirals;
- study protocols to further assess the effectiveness of antivirals for treatment and prophylaxis during a pandemic; and
- effective communication and education materials on antivirals for health care workers and the public.

Many of these issues are currently being addressed by the Antivirals working group.

Antiviral interventions will need to target specific populations, given that anticipated supply will be lower than anticipated demand. The PIC will make recommendations and provide advice concerning the identification and prioritization of individuals and groups of people to receive antiviral drugs for treatment and prophylaxis during the pandemic. Guidelines for the use of antivirals at times of short supply (priority groups) are being developed (see Annex E). It is important that any antiviral response strategy be flexible given that the epidemiology (i.e., age-specific morbidity and mortality rates) of the pandemic and the availability of vaccine will only become evident once the pandemic has started. The timing of the use of antivirals during a pandemic should be guided by local surveillance data.

Suggested priority groups at this time will be in line with the overall goal of reducing morbidity and mortality. The role of antivirals in minimizing societal disruption is as yet unknown because current clinical evidence is limited and has yet to establish whether antivirals slow down or decrease viral transmission. Therefore, it may be most efficient to treat those patients who present within 48 hours of onset of influenza symptoms, with priority given to the severely ill and those with risk factors for severe complications.

During a pandemic, antiviral strategies should utilize all anti-influenza drugs available to Canadians and be adaptable to changing disease epidemiology and vaccine availability. It is recommended that amantadine be used for prophylaxis and the neuraminidase inhibitors be reserved for treatment of cases. This recommendation is based on the efficacy of these two types of drugs, which is approximately equal for treatment of cases, and the desire to minimize the development of amantidine resistance during the pandemic.

3.2.4 Health Services Emergency Planning

During the pandemic there will be a marked increase in demand for people (health care workers and others) to care for the sick and appropriate locations and equipment, to facilitate the provision of health care. Communities and health care organizations will need to have plans in place that will address what will be done when the health care system is overwhelmed and care must be provided by persons, both health care workers and volunteers, doing work which is not normally part of their daily activities and potentially in settings not usually used for health care.

The objectives of health services emergency planning are:

- to identify issues that will require multi-level collaborative planning during the interpandemic period;
- to facilitate awareness of the potential impact of a pandemic on the health care system;
- to prepare resources and guidelines that may be adapted during a pandemic.

3.2.4.1 Current Status

Outbreaks of influenza occur annually in Canada. The morbidity and mortality during any given influenza season is largely dependent on the circulating strain(s) of influenza virus, and the susceptibility of the population. Those normally at high risk of influenza complications are the elderly, persons with chronic cardiac or respiratory conditions and the immunocompromised.

The spectrum of illness seen with influenza is extremely broad, ranging from asymptomatic infection to death, frequently due to secondary bacterial pneumonia or exacerbation of an underlying chronic condition. Many institutions in Canada are presently running at maximal or near maximal bed capacity. At the peak of the demand for health care during annual influenza seasons it is difficult for many facilities to manage the increased demand for beds and the demand for emergency room care. A report by the Manitoba Centre for Health Policy and Evaluation showed that the total number of hospital admissions and ambulatory visits provided by the Winnipeg health care system increased only slightly (5% to 7%) during severe influenza seasons, however, the number of patients presenting with influenza-like illnesses increased substantially (approximately 70% for admissions, and 35% to 40% for physician visits). This indicates that there is an overall maximum of services which can be provided, which does increase somewhat in response to need, but also that the patient mix changes in response to the need for influenza care. (http://www.umanitoba.ca/centres/mchp/reports/reports_97-00/seasonal.htm) The scarcity of health resources will be exacerbated during a pandemic and may exceed the capacity of the current health care setting to cope.

Health services guidelines have been developed by the various PIC working groups to assist acute and chronic care institutions, health care planners, clinicians, and other stakeholders with planning for and coping with large numbers of influenza cases, some of whom may have severe disease or life-threatening complications. These documents are included as annexes to this plan for ease of use, and can be broadly classified into the following categories: clinical, infection control, resource management, and non-traditional settings and workers, which correspond to the main responsibilities of each of the working groups. The documents provide options, worksheets and guidelines to facilitate planning for a consistent and comprehensive response within the health sector.

These working groups will also be looking attraining and education modules for health care workers, volunteers and the public, and aftercare/recovery planning issues.

3.2.4.2 Planning Principles and Assumptions

Due to the broad scope of these planning activities this section has been sub-divided to correspond to the sub-groups that have been working on the different aspects of this component. Where relevant, documents or tools in the Annex will be referenced.

i) Infection Prevention and Control

The incubation period for influenza usually ranges from one to three days. Influenza is spread from person-to-person by inhalation of small particle aerosols, by large droplet infection, by direct contact , or by contact with articles recently contaminated by nasopharyngeal secretions. Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. The importance of the airborne route in influenza transmission is uncertain. Influenza is highly contagious; it can spread quickly in settings where large groups of people are gathered together, for example, among institutionalized populations.

The period of communicability for influenza virus is during the 24 hours before the onset of symptoms, and during the most symptomatic period, usually three to five days from clinical onset in adults and up to seven days in young children. In adults, the amount of viral particles shed for instance, while sneezing or coughing, is related to the severity of illness and temperature elevation. For those receiving antiviral therapy, the duration when virus particle are shed is likely to be shorter.

Survival of the influenza virus, outside the body, varies with temperature and humidity. It generally survives 24-48 hours on hard, non-porous surfaces, 8-12 hours on cloth, paper and tissue, and five minutes on hands. Survival of the virus is enhanced under conditions of low humidity and in the cold.

During the next pandemic it will be imperative to keep health care workers as healthy as possible. Occupational health issues which need to be considered include: vaccination of health care workers, use of personal protective equipment, work exclusion/fitness to work criteria, and work reassignments (see Annex F).

The institutional infection control guidelines (Annex F) contain sections for both acute and long-term care institutions. The issues addressed include: immunization, hand hygiene, use of personal protective equipment (masks, gloves, gowns), patient isolation/accommodation, restriction of visitors, staff cohorting, environmental cleaning, and education for staff, patients and visitors.

The community infection control guideline (Annex F) contains sections pertaining to the general public, health care workers providing services in the community, as well as office-based medical and non-medical health care providers (public health clinics, physicians' offices, dental offices, physiotherapy clinics, and alternative health care providers). The issues addressed include: hand hygiene, the use of personal protective equipment (masks and gloves), cohorting persons with influenza-like illness (ILI), as well as temporary closure of schools, day cares and large, "non-essential" businesses.

ii) Clinical Management of Influenza

The last two influenza pandemics occurred in 1957–1958 and 1968–1969. Therefore, the majority of currently practicing clinicians would have little or no experience with pandemic influenza disease and may not be aware of its potential variant presentation. The clinical guidelines that have been developed (Annex G) provide recommendations on the triage of pediatric and adult patients and on the management of patients within Long-Term Care Facilities (LTCF). Clinical Management of Influenza forms have been developed in order to assist health care staff with case management (Annex G). One form contains sections on investigations which should be considered, treatment recommendations, as well as information pertaining to the selection of patients (children and adults) for hospital admission and for admission to intensive care. Standardized admission and primary care forms, with a triage component, have also been developed to help to ensure consistency and minimize paper work (Annex G).

During a pandemic, it will be essential to inform both the public and health professionals about the symptoms and treatment of influenza, as well as when to seek advice and refer (see Annex G). Fact sheets regarding the clinical features of influenza and secondary complications have been developed to assist health care providers with diagnosis, and the general public with self-treatment (Annex G). These fact sheets include information pertaining to children, adults and the elderly. Any educational materials require advanced preparation in addition to an efficient and timely distribution plan.

iii) Resource Management

Although the impact of a pandemic is unpredictable, for planning purposes it is advisable to expect a major disruption in critical community services. The health care system's response to this situation will be crucial. Regional, local and institutional planners will need to assess their health resource utilization and their health system capacity to cope during severe influenza epidemics and compare this to the estimated capacity required to response to a pandemic for their catchment area. The FluAid software using a U.S. model for estimating the health impact of a pandemic may be considered for resource planning purposes (http://www2.cdc.gov/od/fluaid/default.htm). In the U.S. model, however, health outcome was based on health care seeking behaviour or treatment received. It is expected that the treatment received in Canada for a person similarly ill with flu may be quite different based on differences in the health care systems, practice patterns and health care seeking behavior. The model further assumed that health care was available for all persons seeking care, consistent with the U.S. demand-driven health economy.

It is expected that a substantial proportion of the work force may not be able to work for some period of time during the pandemic due to illness in themselves or in their family members. Health care workers are likely to be at higher risk of illness due to their exposures. During the 1957–1958 pandemic, the United Kingdom experienced an estimated 20% absenteeism rate in the general population and one-third of the staff in one hospital was ill during the peak of the pandemic.

Although in the majority of instances influenza is an acute, self-limiting upper-respiratory infection, complications do occur. In influenza epidemics and pandemics the overall attack rate is relatively high and occurs during a few weeks in any one location. Consequently, even a low frequency of complications result in marked increases in rates of hospitalizations. It is important to consider that while the waves of the pandemic tend to last for six to eight weeks in any locality, the demand on the health care system will not be at a constant rate during this period as the number of new cases seeking health services is likely to increase, peak, and then decline. The next pandemic wave may closely follow the first wave leaving little time for recovery. Resource needs will need to be reassessed continuously during this potentially overwhelming situation. It will be a challenge for acute care facilities to manage high ward census, high intensive care unit census, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment (see Annex H). Advanced consideration should be given to the management of adult and pediatric patients with respiratory distress when oximeters, ventilators, and other respiratory support equipment must be rationed.

Each facility needs to evaluate its human resources. As health care and hospital workers encompass a vast number of different individuals and occupations, a list of health care workers has been developed to assist with planning (Annex H). Emergency reallocation of staff and maintenance of staffing levels will be essential. Health care worker training and continuing education to encourage workers to maintain their skills, incentives to maintain training, and on-going communication are all important and should be planned for during the pre-pandemic period. During the pandemic, child care, emotional support and grief counseling needs to be addressed to facilitate maintenance of adequate staffing levels.

Elective medical and surgical admissions will need to be prioritized and possibly cancelled to meet some of the increased demands. A checklist of issues that should be considered during this prioritization process has been developed for Acute Care facilities (Annex H). Each institution will also need to evaluate their bed and ventilator capacity. A worksheet has been developed to assist facilities with determining their potential surge capacity (Annex H).

Pandemic influenza historically has been associated with excess mortality. It will be essential for jurisdictions to include a corpse management plan as part of their pandemic plan. Guidelines for the management of mass fatalities (Annex I) have been developed to assist with this process. Issues which are addressed include morgue capacity, corpse storage, transportation, management, burial/cremation, and grief counseling.

Planning needs to be undertaken by all orders of government and health service institutions throughout the country to anticipate and put into place strategies to meet a greatly increased demand for services in conjunction with staff shortages.

Recommendations on how to manage scare resources during an immunization pandemic are included in Annex H.

iv) Non Traditional Workers: Health Care Workers and Volunteers

Communities and health care organizations need to have strategies in place that will address what will be done when health care facilities are overwhelmed and medical care must be provided in non-traditional settings. Temporary hospitals and outpatient clinics may need to be set up to provide care. Guidelines for the provision of care in non-traditional settings have been developed to assist with this task (Annex J). The issues addressed include: administrative options for non-traditional hospitals, potential resources and sites, critical characteristics and support services needed, type of work done within the sites, and liability protection.

Guidelines have also been developed addressing the potential sources of additional labour during a pandemic, volunteer recruitment and screening, liability and personal insurance of workers, temporary licensing of workers, roles and responsibilities, and training programs (Annex J).

3.2.5 Emergency Services

Emergency services personnel should be engaged in all levels of pandemic planning. While it is expected that health authorities will lead the pandemic response in terms of surveillance, vaccine usage, use of antivirals and public health measures, and emergency service providers will play a critical role in coordinating the overall emergency response. The deployment of these services will be staged in accordance with the Canadian Pandemic Phases and will depend on the severity and impact of the pandemic.

The objectives of emergency service planning are:

- to encourage collaboration between emergency service personnel and public health authorities to ensure that the planned pandemic response will be coordinated;
- to facilitate a continuous state of "readiness" through ongoing education, testing and revision of response plans.

3.2.5.1 Current Status

Emergency service authorities have been involved in the development of P/T pandemic plans. At Health Canada, the Centre for Infectious Disease Prevention and Control and the Centre for Emergency Preparedness and Response have worked together to ensure that the expertise contributed by each area is reflected in the development of this comprehensive plan.

3.2.5.2 Planning Principles and Assumptions

Public Health authorities will need to work with those in the emergency service field in their jurisdiction in addition to other key stakeholders. The formation of a multi-disciplinary committee with clear authority and ability to coordinate pandemic planning and response in the P/T is essential. Roles and responsibilities during each pandemic phase need to be assigned to individuals and organizations during the interpandemic period with mechanisms in place to compensate for staff turnover and attrition.

Each of the P/Ts have their own emergency preparedness legislation that deals comprehensively with emergency management issues within their boundaries. All planning will need to take the applicable legislation into consideration.

Response plans will need to be tested, likely in the form of emergency exercises involving all partners, on an ongoing basis.

3.2.6 Public Health Measures

There are certain decisions that will need to be made at each level of government as the threat of the pandemic emerges. Local public health officials will be asked about what measures can be taken by the public and within the community in order to prevent or control pandemic influenza in their jurisdiction. These decisions will range from population-based recommendations, for example whether to cancel public gatherings or close schools, to individual measures like whether members of the public should where masks. The effectiveness of these types of measures for the control of disease within a population have not, for the most part, been systematically evaluated. In addition, the potential impact of these measures will vary based on the phase of the pandemic in the particular community and the availability of other interventions such as vaccines and antivirals. The purpose and effectiveness of these measures may also be different in isolated communities compared to large urban centres.

The implications of these potential measures which range from local school closures to quarantine recommendations for ports of entry into Canada, must be recognized by all potential stakeholders and discussed during the interpandemic period.

The objectives of public health measures planning are:

- to make recommendations regarding public health measures such as quarantine, cancellation of public gatherings, and school closures,
- to foster development of a common approach within Canada and also, if possible, between the U.S. and Canada especially on issues for which there is a lack of scientific evidence to guide decision-making
- to encourage planning at all levels of government that will raise awareness regarding potential impact of these measures so that necessary partnerships and consultations with external stakeholders and take place during the interpandemic period.

3.2.6.1 Current Status

The Public Health Measures Working Group was formed in November 2002 after a list of outstanding issues, classified for convenience as "public health measures", was generated based on feedback from working group members and other reviewers of the draft. This new working group is currently refining the list of issues that need to be addressed and actively seeking literature and expert opinion on these issues. A guideline document will be developed once this consultation and review process has been completed and there is consensus on recommendations.

3.2.6.2 Planning Principles and Assumptions

The Public Health Measures Working Group will be making recommendations to facilitate a consistent and optimal response to public health communicable disease control issues during a pandemic. Since there is a lack of scientific data on the effectiveness of these types of disease control measures, especially in conjunction with other influenza control measures, it is unlikely that the benefits of these measures will be quantifiable, especially in advance of the population being exposed to the pandemic virus. Therefore, in the absence of any conclusive data, the group will be making recommendations for the purpose of facilitating consistency between jurisdictions, which is considered to be valuable during the response phase.

P/T and local level planners are encouraged to explore the feasibility and implications of these types of control measures within their jurisdictions and to educate stakeholders (e.g., school boards, local business owners such as theatre owners etc.), should it become advisable to implement these types of restrictive measures during a pandemic.

3.2.7 Communications

During a pandemic two main messages will need to be expressed: what the ministry or other organization is doing and what the public can do. As the pandemic evolves the number of organizations that will become involved with the media on this issue will be enormous; there will be financial issues, human resource issues, social issues — issues affecting every area of society. Due to this broad scope it will be virtually impossible to have any "control" over the information. The focus instead should be on information management. Information management has three components: meeting the demand for information, acknowledging the limits of government capacity to solve every problem, and using consistent and complementary messages. Unlike other types of emergencies where the media coverage is much shorter, the information demands during a pandemic will be sustained over a long period, resulting in tremendous information demands. Sustaining public confidence over many months will be a huge challenge that will be based in part on consistency.

All key audiences (external, internal and international) must receive consistent, comprehensive and relevant information in a timely manner during any type of emergency. Planning activities are aimed at ensuring uniform and consistent messaging across Canada.

The objectives of communication planning are to:

- ensure that Canada's health partners are prepared to respond to enormous public communications challenges
- identify specific activities to promote consistent, coordinated and effective public communications
- describe options to ensure that the public communications demands of various scenarios are met clarify what activities should occur during the specific phases of the pandemic
- clarify what activities should occur during the specific phases of the pandemic

3.2.7.1 Current Status

Provincial/Territorial/Local

Most communication activities around influenza take place immediately preceding, and during, the typical influenza season from October to May each year. P/Ts produce materials to promote immunization each fall which are specific to the program they are offering in their jurisdiction. Most communication materials and strategies targeting the general public, media, health care workers and other community organizations (considered to be "external" key audiences) are geared at promoting immunization and reducing unnecessary hospital visits. These materials are developed at the P/T and local level with minimal federal input. To date, there has not been a centrally coordinated education campaign regarding pandemic influenza which targets the external key audiences.

F/P/T

A secure website has been set-up to facilitate pandemic planning and sharing of key resources among recognized stakeholders. The role of this website as a communication tool will likely be expanded during the pandemic.

Communication with "internal key audiences", mainly government decision makers and policy advisors, occurs at all levels of government. With respect to pandemic planning, the Pandemic Influenza Committee, which includes P/T representation, reports through the Advisory Committee on Population Health and Health Security to the Conference of Deputy Ministers. In addition, in February 2002 the role of Chief, Crisis Communications was established by Health Canada. This office is working on an "all-hazards approach" which is establishing protocols for F/P/T interaction. One initiative was the creation of a network of F/P/T communications contacts. This network was mobilized in during in response to the SARS outbreak and continues as a key component in communication planning for pandemic influenza and other health emergencies.

Federal

Federal communications on influenza currently focus on the dissemination of surveillance data, through FluWatch bulletins, which are directed to public health professionals but available to the public through the Health Canada website. These bulletins are produced on a weekly basis throughout the influenza season. Information regarding international influenza activity is disseminated by CIDPC, mainly through email or website postings, to key stakeholders as necessary. As well, fact sheets on influenza, including influenza vaccines, are posted on the Health Canada Website. Health Canada also communicate with "international key audiences" including the WHO and PAHO regarding influenza activity within and outside of Canada.

For emergency situations Health Canada does have a public information line which can be set up for "around -the-clock" coverage. Other communication issues are also being addressed as part of the "all-hazards approach" to crisis communications.

3.2.7.2 Planning Principles and Assumptions

The Communications annex for the CPIP (Annex K) makes references to strategic considerations, target audiences, and recommended notification and public communication activities for consideration when planning for pandemic influenza.

It is important to ensure that all participants in the F/P/T communications network have identified fully trained back-up personnel that can step in if the original member is not available. When planning for this type of event, where the onset is unknown, succession training must be considered an ongoing activity.

The identification of spokesperson(s) and establishment of new, or evaluation of current distribution mechanisms (e.g., a toll-free phone number) also should occur during the inter-pandemic period. Templates for fact sheets, briefing notes and media communications may also be prepared in advance.

All governments should prepare to conduct their communications and public relations activities in a manner designed to retain public confidence, minimize disruption and anxiety.

Health Canada Communications would coordinate and facilitate Canada's response to pandemic influenza, with partners at the federal, provincial and local levels. Partners have varying roles and responsibilities, and coordination is crucial to ensure that messages are accurate and consistent and that jurisdictional boundaries are respected.

The development of the "all-hazards" communications plan is underway and would become a key part of communications planning for pandemic influenza. Health Canada would work with provincial and territorial ministries of health to develop key messages and mechanisms to communicate these messages to target audiences.

Health Canada Communications would identify departmental spokespersons and provide media training where necessary. All levels of government should agree to key messages and the role of spokespersons at all levels.

3.3 Planning and Preparedness Checklists

Planning and response activities can be broadly divided into four categories: prevention, preparedness, response/implementation and post-event recovery/after care. In the pre-pandemic period activities will focus on prevention and preparedness. Implementation of the response activities occur once an alert for a pandemic has been issued. Recovery and evaluation activities occur in the post-pandemic period. Front end investment of resources in prevention and preparedness activities will facilitate effective management of the pandemic and mitigation of negative outcomes.

In order to manage an emergency effectively it is essential to have comprehensive response plans in place. With respect to pandemic planning, the existence of these plans needs to be communicated to all potential stakeholders. Copies should be distributed to organizations and individuals that would be involved in the pandemic response and if possible advance testing of these plans should be coordinated with a mechanism to provide feedback to improve or update the plans.

This section of the document includes checklists specifically for influenza pandemic planning. This section is designed to facilitate P/T and local planning, possibly through the adaptation of existing emergency response plans.

To facilitate consistency the response plan will use the WHO pandemic phases to document the progression of the pandemic and need for specific actions in Canada. Most other countries have used this same approach.

3.3.1 Pandemic Planning Checklists

Planning for a pandemic involves consideration of what activities are necessary for optimal management of each stage of the pandemic. In this part of the document, activities have been listed and grouped according to the following components of the Plan:

- Surveillance
- Vaccine Programs
- Antivirals
- Health Services Emergency Planning and Response
- Communications

(At time of publication a list corresponding to the Public Health Measures component had not yet been developed.)

These lists have been developed to facilitate planning at the P/T and local levels and essential reflect planning activities that should be undertaken in the inter-pandemic period (i.e., Phase 0, Level 0). Actions corresponding to the other WHO Phases (starting with Phase 0, Level 1) are addressed in the response section of the Plan. Many of these activities and corresponding federal activities/responsibilities have been discussed and addressed by the various pandemic planning working groups. For further information on roles and responsibilities refer to the introduction/background section of the Plan.

Documents that have been developed by the working groups will be annexed in this preparedness section of the Plan or distributed as they become available. This is a preliminary list of planning activities (aimed at P/T and local planners) that will need to be reviewed on a regular basis and updated as planning activities are completed. These planning activities should occur during the inter-pandemic period, recognizing that when novel strains are detected or pandemic activity starts plans will need to be reviewed and adapted as necessary.

3.3.1.1 Surveillance Checklist

- Improve disease based surveillance, in collaboration with Health Canada's Centre for Disease Prevention and Control (CIDPC). Includes improvements to the current system and consideration of enhancements (e.g., emergency room surveillance and real-time influenza mortality surveillance)
- Improve virologic surveillance capability by ensuring at least one laboratory within the P/T has the capability to isolate and subtype influenza virus.
- Establish link with avian/swine influenza surveillance contacts within P/Ts.
- Develop protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages.
- Develop/improve communication mechanisms for the rapid and timely exchange of surveillance information between P/Ts, CIDPC and local stakeholders.
- Together with public health response consider how recovered cases, who are presumably immune to the novel virus, can be identified by occupation (e.g., health care provider or essential service worker) and location, thus facilitating development of a "list" of immune workers that may be strategically deployed.
- Consider how special studies, identified in collaboration with CIDPC, may be activated in your jurisdiction.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of surveillance activities in the post-pandemic period (including socio-economic evaluations).

3.3.1.2 Vaccine Programs Checklist

- Enhance annual influenza vaccination coverage rates in NACI recommended "high-risk" groups, particularly groups with low coverage levels.
- Increase annual influenza vaccination coverage rates among health care and essential services workers.
- Increase pneumococcal vaccination coverage levels in NACI recommended "high-risk" groups (to reduce the incidence and severity of secondary bacterial pneumonia).
- Consider P/T modifications or refinements of nationally-defined priority target groups depending on local circumstances. For example, there may be specific groups of people in selected P/T whose absence due to influenza illness could pose serious consequences in terms of public safety or disruption of essential community services (e.g., nuclear power plant operators, air-traffic controllers at major airports, workers who operate major telecommunications or electrical grids).
- Modify/refine other aspect of the federal guidelines, as needed for P/T and local application.

- Develop contingency plans for storage, distribution and administration of influenza vaccine through public health and other providers to nationally-defined high-priority target groups, including:
    - Mass immunization clinic capability within P/T,
    - Locations of clinics (e.g., central sites, pharmacies, work place),
    - Vaccine storage capability – identify current and potential contingency depots,
    - Numbers of staff needed to run immunization clinics,
    - Plans to deploy staff from other areas from within and outside public health to assist in immunization,
    - Advanced discussions with professional organizations and unions regarding tasks outside routine job descriptions during a pandemic,
    - Training plan for deployed staff, and
    - Measures to be taken to prevent distribution to persons other than those in the priority groups.
- Determine how receipt of vaccine will be recorded and how a two-dose immunization program would be implemented in terms of necessary re-call and record-keeping procedures.
- Determine the number of people within the P/T who fall within each of the priority groups for vaccination (i.e., high-risk groups, health care workers, emergency service workers, specific age groups).
- Verify capacity of suppliers for direct shipping to health districts.
- Develop plans for vaccine security:
    - During transport
    - During storage
    - At clinics
- Ensure appropriate legal authorities are in place that will allow for implementation of major elements of the proposed distribution plan. (For example, will P/T laws allow for non-licensed volunteers to administer influenza vaccine? Do P/T laws allow for "mandatory" vaccination of certain groups, if vaccination of such groups is viewed by the P/T public health officials as being "essential" for public service?)
- Co-ordinate proposed vaccine distribution plans with bordering jurisdictions.
- Enhance VAAE surveillance, in collaboration with CIDPC.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of pandemic vaccine program activities in the post-pandemic period (including socio-economic evaluations).
- Review and modify plans as needed on a periodic basis.

3.3.1.3 Antivirals Checklist

- Consider the need for and availability of antiviral drugs including mechanisms for ensuring a secure supply of antiviral drugs.
- Modify/refine guidance provided by the Antivirals working group, as needed for P/T and local application (e.g., plan how to distribute available antivirals based on priority groups).
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of an antiviral response in the post-pandemic period (including socio-economic evaluations).

3.3.1.4 Health Services Emergency Planning

- Develop P/T guidelines (modify federal guidelines) for prioritizing health care needs and service delivery, accessing resources and implementing infection control measures during a pandemic.
- Ensure that liability/insurance/ temporary licensing issues for active and retired health care workers and volunteers are addressed with P/T licensing bodies. Define the extent of care that health care workers/volunteers can perform according to P/T laws and union agreements.
- Bulk purchase and stockpile extra medical supplies. Explore the options for stockpiling extra medical supplies and identify sources for additional supplies.
- Develop mechanisms for coordinating patient transport and tracking/managing beds, e.g., central bed registries, call centre and centralised ambulance dispatch.
- Develop detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at different health care settings and the triage across sites; human resource, material and financial resource needs should be identified and consideration provided for prioritizing patient care.
- Assess health care personnel capacity: estimate number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, LTCF, paramedical); estimate number of non-active HCW (retired)
- Determine sources from which additional HCWs and volunteers could be acquired, include Emergency Measures Organizations and NGOs (Red Cross, St. John ambulance) in pandemic planning.
- Determine the number and type of health care facilities, and estimate their capacity: hospital beds, ICU beds, swing beds, emergency department, ventilatory capacity, oxygen supply, antibiotic supply.
- Determine potential alternative sites for medical care (possible sites could include shelters, schools, gymnasiums, nursing homes, day care centres).
- Identify sources of extra supplies needed to provide medical care in these non-traditional sites.
- Determine the capacity of mortuary/burial services, as well as social and psychological services for families of victims.
- Co-ordinate clinical care and health services plans with bordering jurisdictions to avoid migration to centres of perceived enhanced services.

- Consider establishing a Health Services Emergency Preparedness and Response group to ensure adequate participation by the health care sector and volunteer organizations in planning activities.
- Develop aftercare/recovery plans/guidelines.
- Ensure that guidelines are distributed to regional/local jurisdictions.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of the impact of the pandemic on health services in the post-pandemic period (including socio-economic evaluations).
- Review and modify plans as needed on a periodic basis.

3.3.1.5 Emergency Planning and Response

- Identify the advantages of declaring a P/T emergency during a pandemic.
- Develop contingency plans to provide food, medical and other essential life-support needs for persons confined to their homes by choice or by direction from P/T/L health officials.
- Ensure communication between P/T Ministries of Health and Emergency Responders Organizations, as well as other P/T Ministries or Departments which would be impacted by a pandemic.
- Within P/T, estimate numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities, telecommunications and F/P/T/L leaders (political leaders, managers of response teams) essential to pandemic response.
- Identify military personnel and voluntary organizations which would assist during a pandemic.
- Develop listing of essential community services (and corresponding personnel) whose absence would pose a serious threat to public safety or would significantly interfere with the ongoing response to the pandemic.
- Develop contingency plans for emergency back-up of such services and/or provision of replacement personnel.
  - Replacement personnel could come from lists of retired personnel and/or government or private-sector employees with relevant expertise.
  - Critical personnel in the non-health sector should also be considered as high-priority candidates for vaccination and/or chemoprophylaxis.
- Conduct environmental assessments of surge capacity of hospitals, alternate care sites, and other facilities.
- Develop aftercare/recovery plans/ guidelines.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of the emergency response in the post-pandemic period (including socio-economic evaluations).
- Conduct simulation exercise(s) .

3.3.1.6 Communications Checklist

- Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health .
- Develop scenarios extending from the main Plan and for each circumstance establish 1) communications lead 2) strategic considerations 3) draft initial response.
- Translate messages into additional languages based on local demographics.
- Develop inventories of existing communication systems (hardware and software).
- Identify gaps in the existing systems that will require additional resources.
- Develop plans and mechanisms for communicating quickly and consistently with other jurisdictions and organisations.
- Develop plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees .
- Pilot test "single-window" points of contact in involved jurisdictions and organizations to ensure names/numbers/e-mails are up-to-date and document sharing is possible.
- Develop performance measurement criteria, to facilitate evaluation of the communication activities in the post-pandemic period (including socio-economic evaluations).

Section Four

RESPONSE

4.1 Introduction

In the previous sections of this Plan the conceptual and historical basis for pandemic planning were presented, the over-arching principles were highlighted, and preparedness activities corresponding to each component of the response were addressed in terms of current status, including outstanding issues, planning principles and assumptions.

In this, the Response Section of the Canadian Pandemic Influenza Plan, activities corresponding to each component (i.e., surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications), have been organized by Pandemic Phase. The tables presented include the key actions necessary to facilitate a comprehensive and consistent response to an influenza pandemic. It is recognized, however, that additional details and modifications will need to be added when the pandemic unfolds. For example, since it cannot determine in advance of a the appearance of a novel virus when an effective vaccine might be available, all activities listed under the "Vaccine Programs" component may occur at different phases than as currently listed in this document.

4.2 Phased Approach

The use of the WHO Pandemic Phases is helpful for planning purposes and to succinctly describe "the big picture" as the pandemic unfolds. For responders at the time of a pandemic, the focus will be on more localized "triggers" which may or may not correspond to the global situation. Furthermore within Canada there may be a period of time in Phase 2 where outbreaks have occurred in multiple but discrete locations as opposed to multiple nation-wide outbreaks. Therefore planners at all levels in the health and emergency service sectors, from municipal to federal, are encouraged to think about what "phase" their jurisdiction is in order to operationalize an appropriate response and also to recognize that their plans will be affected by the epidemiology of the pandemic nationally and globally. For example, the use of antiviral drugs may not be an option if global supplies are exhausted by other countries affected early in the pandemic.

Other unknown factors like the age distribution and severity of the illness caused by the pandemic strain and efficiency of transmission from human to human will also affect the response measures. This plan assumes the worst-case scenario and therefore may need to be significantly modified if the epidemiology does not support aggressive measures.

4.3 Federal Emergency Response

Planning at the federal level has resulted in the development of a generic emergency management structure. This structure, which indicates roles and responsibilities of specific groups in response to an emergency, is included in Annex L. It is envisioned that for pandemic influenza the PIC will provide technical advice, akin to the "Technical Advisory Group" (TAG) in the management structure. However, unlike the TAG, in the case of an influenza pandemic PIC would report to the Deputy Ministers of Health, not the Emergency Manager, as agreed upon in the current Working Agreement (see Introduction Section of the Plan for more detail on the role of PIC). The specific composition, roles and responsibilities of the "Advance Planning Group" still needs to be determined, however, members that can provide technical advice specific to pandemic influenza will be essential.

Also included in Annex L is a flow diagram that aligns response activities with the pandemic phases. This tool provides a visual overview of the response from a federal perspective.

The Canadian Pandemic Influenza Plan is a disease specific plan. It is the most specific, and therefore technical, type of emergency plan being developed as part of much larger initiative to create plans to deal with all types of national emergencies. By creating a set of plans that increase in specificity, that is, range from generic emergency response issues to more specific threats such as infectious diseases and finally to detailed disease-specific threats, it is anticipated that a set of "nested" or linked documents will be available that will be comprehensive enough and flexible enough to cover off any type of national emergency.

4.4 Experience to Date

Prior to March 2003, when Severe Acute Respiratory Syndrome (SARS) arrived in Canada, the vast majority of health care professionals and certainly the general public had limited personal experience with large outbreaks of serious respiratory infections. The SARS outbreak caused an exponential increase in the knowledge and experience with this type of health threat. Awareness of SARS, the severity of the illness, method of spread and implemented control measures penetrated Canadian society from coast to coast regardless of the actual case count in each province or territory. A previously largely unrecognized vulnerability was exposed in the headlines and on television as images of masked faces dominated the media.

Aware of the vulnerability, those involved in disease surveillance and pandemic planning saw this as a type of "dress-rehearsal" for pandemic influenza, recognizing that many of the response issues would be the same but on a much larger scale for influenza. Despite the high cost in terms of morbidity and mortality and economic losses due to SARS, pandemic influenza has the potential to be much worse. The response to pandemic influenza would need to be sustained for a longer period of time and would likely include a mass immunization effort on top of the acute care demands of caring for patients.

The SARS experience reinforced the need for preparedness activities as cited in the Preparedness Section of this plan. In particular the need for resources and surge capacity within the health system to deal with public health emergencies was highlighted. Advanced preparation and removal any potential barriers in communication systems, data management technology, acquisition and mobilization of supplemental health care workers and settings, are just a few of the other needs identified in the Plan and validated by the SARS experience.

It is with this experience behind us that those involved in drafting this Plan have identified the key action items listed in this section of the Plan.

4.5 Key Response Activities by Pandemic Phase

The key response activities listed below have been organized by the component of the response that they relate to and the phase at which the action should take place. As previously discussed, there needs to be flexibility in the response since the availability of resources, such as vaccine or antiviral drugs, may necessitate deviation from the proposed sequence of response activities. It is expected that many of the response activities within each phase will need to occur simultaneously. The action items have not been prioritized within each phase.

The tables also include "Response level" designations (see Legend below) which have been provided for guidance only. It is likely that many activities, especially those currently designated as a "federal" level response, will be carried out by PIC or FPT-PIC sub-committees. Other non-governmental responders (e.g., Salvation Army, Red Cross) will likely be involved in the response but have not been specifically identified in this plan since it is anticipated that their respective roles/activities would be developed in conjunction with public health authorities.

Legend:

F = Federal P/T = Province/Territory L = Local

CPHLN = Canadian Public Health Laboratory Network
HPFB = Health Products and Food Branch
NACI = National Advisory Committee on Immunization
PPHB = Population and Public Health Branch
PWGSC = Public Works and Government Services Canada
CIHR = Canadian Institutes for Health Research

Phase 0, Level 1 Novel virus identification in a human

Component	Focus	Actions	Response Level
Surveillance	Establish/heighten existing surveillance systems Information sharing	› Collect and compile epidemiological data from involved countries	F *(Lead: PPHB)*
		› Alert those currently involved in influenza surveillance (e.g., PIC, CCMOH, CPHLN, FluWatch) ▸ Messages from Health Canada to include information only ▸ Recommendations to be included by P/T or L level or, after consensus achieved, by PIC ▸ All correspondence to include list of recipients	F, P/T, L *(Lead: PPHB)*
		› Review and confirm that all inter-pandemic (L0,P0) surveillance activities (via FluWatch) are operating optimally	F,P/T,L
Vaccine Programs	Mitigation of potential complications of influenza through use of current vaccine resources	› Promote pneumococcal vaccination of NACI recommended "high-risk" groups (to reduce the incidence and severity of secondary bacterial pneumonia)	P/T, L
Antivirals	Information gathering	› Assess/Re-assess availability of antiviral medications	F *(Lead: PPHB)*
Health Services	Evaluation of laboratory capacity Information gathering	› Ensuring at least one laboratory within the P/T has the capability to isolate and subtype influenza virus and if not establish anticipatory "back-up" process	P/T *(Lead: CPHLN)*
		› Ensure that estimates of health care personnel capacity are current (i.e., estimated number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, LTCF, paramedical); estimated number of non-active HCW (retired) ▸ If possible identify HCW by type of work that they usually do	F, P/T,L
Emergency Services	Information sharing	› Notification of emergency service managers of report of novel virus and current monitoring activities) ▸ Would include Emergency Health Services and Emergency Social Services managers at the P/T level	F, P/T *(Lead: Each P/T for their respective managers, PPHB for federal/national managers)*

Phase 0, Level 1 Novel virus identification in a human			
Component	**Focus**	**Actions**	**Response Level**
Public Health Measures	Information preparation	› Review of existing public materials on influenza and influenza pandemics	F,P/T,L
		› Review/Update educational materials on all aspects of influenza ▸ For health care professionals, other special audiences and the general public	F,P/T,L
Communications	Communication of findings with partners and stakeholders	› Notification of the Health Emergency Communications Network (HECN), as well as communications staff with international and non-governmental organizations	F *(Lead: Office of Crisis Communications, Health Canada)*
	Evaluation of emergency/rapid communication capacity	› Review existing communication systems (e.g., emergency contact lists, toll free capacity, dedicated Internet site capacity, information sharing systems)	F,P/T,L
	Information collection and dissemination	› Work with partners to improve the local, provincial/territorial and federal informatics infrastructure to support the potential information campaign (hardware and software)	F,P/T,L *(Lead: Office of Crisis Communications, Health Canada)*
		› Ensure names/numbers/emails are up-to-date and document sharing is possible	F,P/T,L

Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)*

Component	Focus	Actions	Response Level
Surveillance	Monitoring of evolving situation Dissemination of data	› Ongoing collection and compilation of epidemiological data from involved country (s)	F *(Lead: PPHB)*
		› Review/Revise standard reports for dissemination of epidemiological data	F *(Lead: PPHB)*
		➝ Consider common strategy for the communication of epidemiological data	F,P/T *(Lead: PIC)*
		› Dissemination of epidemiological data	F,P/T
Vaccine Programs	Inventory and resource assessment Preparation (Legal, Educational etc.)	› Conduct initial availability assessment of supplies (e.g., syringes, adrenalin, sharps disposal units), equipment and locations potentially required for a vaccine-based response (i.e., mass clinics)	F,P/T,L
		› Develop list of currently qualified vaccinators and sources of potential vaccinators	F,P/T,L
		› Review educational materials re. Administration of vaccines and adapt/update as needed	F,P/T,L
		› Ensure that any legal issues that may impede rollout of a mass immunization program are addressed	P/T,L
		› Collaborate on international vaccine development initiatives	F *(Lead: PPHB with vaccine manufacturers)*
		› Ensure domestic vaccine manufactures are alerted and participating in international efforts	F *(Lead: PPHB)*
Antivirals	Antiviral strategy	› Perform an inventory assessment (drugs, formulations, and expiry dates)	F, P/T *(Lead:PPHB*
		› Determine the appropriate use of existing supplies	

Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)*

Component	Focus	Actions	Response Level
Health Services	Guideline review/revision Preparation (Legal, Educational etc.)	› Review protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages	F,P/T *(Lead: CPHLN)*
		› Ensure that any legal/insurance issues that may impede recruitment and use of active and retired health care workers and volunteers have been addressed with P/T licensing bodies	P/T
		› Prepare/update communications defining the extent of care that health care workers/volunteers can perform according to P/T laws and union agreements	P/T
Emergency Services	Education	› Review results of any previously conducted simulation exercises and consider what (if any) significant changes have occurred since the exercise was conducted	F,P/T,L
		› Educate new staff about pandemic influenza	F,P/T,L
		› Acquire (when available) and disseminate any laboratory testing materials (i.e., reagents)	F *(Lead: PPHB)*
Public Health Measures	Resource assessment and preparation	› Review staffing requirements for implementation of a pandemic response including mass immunization clinics, control measures, and public education	F,P/T,L
		› Consider delaying introduction of public health programs that may not be adequately resourced if situation evolves into a pandemic or other alternatives such as contracting out	P/T,L
		› Preparation of educational material for public inquiry phone-line staff	F,P/T,L

Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)*

Component	Focus	Actions	Response Level
Communications	Ongoing communication with partners and stakeholders	› Activate inter- and intra-governmental response through national teleconferences (including the HECN, and the NGO health emergency communications group)	F *(Lead: Office of Crisis Communications, Health Canada)*
		› Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health	FPT *(Lead: Office of Crisis Communications, Health Canada)*
		› Ensure that rapid 24 hour translation capacity is in place and that all responders know how to access this resource	F *(Lead: PPHB &/or Co-ordination and Operations Group H.C.)*
		› Ensure that web-site production staff are alerted to the potential need for development of sites and linkages	F,P/T
		› Identify gaps in the existing systems that will require additional resources (e.g., funding for toll free lines, dedicated press conference facilities and HR support for comm. staff)	F,P/T,L
		› Stage background technical briefings for media, external experts and other stakeholders	F,P/T

Phase 0, Level 3 Human to human transmission confirmed

Component	Focus	Actions	Response Level
Surveillance	Establish / Heighten enhanced surveillance systems	› Collect/compile/distribute epidemiologic data from involved country (s)	F *(Lead: PPHB)*
	Border issues	› Establish surveillance or increase current surveillance activities	F,P/T,L
	Plan for streamlined data collection	› Develop any new/updated case definitions	F,P/T *(Lead: PIC)*
		› Implement border-based surveillance (depending on origin of cases) ‣ Including notifications to ill and well travellers	F, P/T *(Lead: PPHB)*
		› Consider implementation of emergency room surveillance (especially in areas known to receive a lot of travelers from affected areas)	P/T,L
		› Implement real-time influenza mortality surveillance	F,P/T,L
		› Determine what information needs to be collected on cases and screening measures and how this will be done (e.g., data collection forms, database issues, data flow)	F,P/T,L
Vaccine Programs	Planning for vaccine distribution	› Ongoing involvement in vaccine development initiatives	F *(Lead: PPHB with vaccine manufacturers)*
	Mass campaign infrastructure	› Review and modify if necessary, contingency plans for storage, distribution and administration of influenza vaccine through public health and other providers to nationally defined high-priority target groups	F,P/T *(Lead: PIC)*
		› Ensure staff are trained and infrastructure is in place to record immunizations, including requirements for a two-dose immunization program (i.e., re-call and record-keeping procedures)	P/T,L
		› Review estimates of the number of people within the P/T who fall within each of the priority groups for vaccination (i.e., high-risk groups, health care workers, emergency service workers, specific age groups) and access strategies	F,P/T,L

Phase 0, Level 3 Human to human transmission confirmed			
Component	**Focus**	**Actions**	**Response Level**
Vaccine Programs *(continued)*		› Consider promotion of current (non-novel virus) influenza vaccination (to decrease the likelihood of re-assortment between the currently circulating strains and the novel strain	F,P/T *(Lead: PIC/NACI)*
Antivirals	Supply of antiviral drugs	› Perform an inventory assessment of available supplies	F,P/T *(Lead: PPHB)*
	Planning for antiviral drug distribution and tracking	› Review/revise recommended priority groups and plans for antiviral use based on available epidemiological data	F,P/T *(Lead: PIC)*
		› Review and modify, if necessary, contingency plans for the availability, distribution and administration of antiviral drugs through public health and other providers to nationally defined high-priority target groups	F,P/T *(Lead: PIC)*
		› Review estimates of the number of people within the P/T who fall within each of the priority groups for receipt of antiviral drugs (i.e., high risk groups, health care workers, emergency service workers, specific age groups) and access strategies	F,P/T,L
		› Ensure staff are trained and infrastructure is in place to track who is receiving the drugs for the purpose of treatment and prophylaxis	P/T,L
Health Services	Management of suspect cases detected through enhanced surveillance	› Implement/Review infection control precautions for case management	F,P/T,L *(Lead: PPHB)*
	Preparation for increased demand on acute care sites	› Anticipate and plan to mobilize human and financial resources	F,P/T,L
	Preparation for providing supportive care in LTCFs	› Review/ update local and P/T data on the number & type of health care facilities, and capacity: hospital beds, ICU beds, swing beds, LTC beds with enhanced level of care, emergency department, ventilatory capacity, oxygen supply, antibiotic supply	P/T,L
		› Review national recommendations for clinical management of cases and modify if necessary	F,P/T *(Lead: PIC)*

Phase 0, Level 3 Human to human transmission confirmed			
Component	**Focus**	**Actions**	**Response Level**
Health Services *(continued)*		› Conduct availability assessment of medications, supplies and equipment potentially needed for the response	P/T,L
		› Review/modify/distribute P/T guidelines (or federal guidelines) for prioritizing health care needs and service delivery, accessing resources and implementing infection control measures during a pandemic	F,P/T,L
		› Disseminate information on medical supply stockpiles and potential need for need and sources of additional supplies	F,P/T (Lead: PPHB)
		› Review/modify/distribute detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at different health care settings and the triage across sites; human resource, material and financial resource needs, and directions regarding prioritizing patient care	P/T,L
		› Disseminate strategy for collection/monitoring of data on health care service use/demands	P/T,L
		› Disseminate strategy for tracking of recovered, presumably immune, cases	P/T,L
Emergency Services	Resource assessment and classification	› Ensure that estimates of numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities, telecommunications and F/P/T/L leaders (political leaders, managers of response teams) essential to pandemic response are current and that lists are available for dissemination	F,P/T,L
		› Ensure that list of essential community services (and corresponding personnel) whose absence would pose a serious threat to public safety or would significantly interfere with the ongoing response to the pandemic, is up to date and available for distribution	L

Phase 0, Level 3 Human to human transmission confirmed

Component	Focus	Actions	Response Level
Emergency Services *(continued)*		› Alert military personnel and voluntary organizations which would assist during a pandemic	F,P/T (Lead: PPHB)
		› Consider international travel advisories	F *(Lead: PPHB)*
Public Health Measures	Preparation of educational materials and public health resources	› Review national recommendations for public health management of cases and other control measures and modify if necessary	F,P/T *(Lead: PIC)*
		› Ensure adequate resources are available to implement recommended public health measures including isolation of cases	P/T,L
		› Prepare/revise educational and guidance materials for public health partners (specifically provincial/territorial and local health departments who will be on the front lines with respect to prevention and control measures), the general public; some documents for the public should emphasize infection control in homes, schools, places of work	F,P/T,L
Communications	Ongoing timely communication with stakeholders	› Increased engagement with international partners	F *(Lead: Office of Crisis Communication H.C)*
		› Establish ongoing communications with media, partners and public	F,P/T,L
		› Activate Emergency Communications processes (as set out in the Emergency Communications Plans within each implicated organizations)	F
		› Establish 1) communications lead 2) strategic considerations 3) draft initial response	F,P/T
		› Recruit/supply additional resources to fulfill previously identified gaps in the existing systems	F,P/T,L
		› Implement plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees	F,P/T

Phase 1 Pandemic confirmed

Component	Focus	Actions	Response Level
Surveillance	Timely collection, compilation and dissemination of epidemiological and clinical data	› Collect/compile/distribute epidemiologic data from involved country (s) (including Canada)	F *(Lead: PPHB)*
		› Define clinical spectrum of disease (based on feedback from local level experts), revise case definitions as necessary	F,P/T,L
		› Monitor surveillance activities; compile and report outcomes	F,P/T *(Lead: PPHB)*
		› Distribute data collection forms and database transmission instructions/ protocols	F,P/T *(Lead: PPHB)*
		› Review protocols for special studies and establish dedicated teams to activate the studies in collaboration with PPHB	F,P/T,L *(Lead: possibly PPHB, PIC, and/or CIHR)*
Vaccine Programs	Vaccine development Preparation/Implementation of mass immunization clinics	› Ongoing involvement in vaccine development/testing/production initiatives	F *(Lead: PPHB, HPFB, manufacturers)*
		› Vaccine purchase	F,P/T *(Lead: PPHB*
		› Review/revise recommended priority groups for immunization based on available epidemiologic data	F,P/T *(Lead: PIC)*
		› Modify/refine of nationally defined priority target groups depending on local circumstances	P/T,L
		› Modify/refine other aspect of the federal guidelines, as needed for P/T and local application	P/T,L
		› Review and modify if necessary, plans for vaccine security (i.e., during, transport, storage and clinic administration)	P/T,L
		When vaccine is available… › Activate immunization clinic capability	P/T,L
		› Implement streamlined VAAE surveillance, in collaboration with PPHB	F,P/T,L *(Lead : PPHB)*
		› Arrange for direct shipping of vaccine to health districts	F *(Lead: PWGSC)*

Phase 1	Pandemic confirmed		
Component	**Focus**	**Actions**	**Response Level**
Vaccine Programs *(continued)*		› Communicate with bordering jurisdictions to facilitate awareness of the vaccine distribution plan and coordination of efforts as much as possible	F,P/T,L
Antivirals	Strategic and controlled use of antivirals	› Review/revise recommendations on antiviral use based on available epidemiologic data	F,P/T *(Lead :PIC)*
		› Based on local epidemiology and available supplies, consider administering antiviral prophylaxis and treatment to priority groups	F,P/T,L
		› Communicate with bordering jurisdictions to facilitate awareness of any antiviral distribution plans	F,P/T,L
		› If antivirals are being used, implement adverse drug reaction reporting system	F,P/T *(Lead: HPFB)*
Health Services	Use of optimal infection control practices Management of increased demand on health care system	› Evaluate infection control recommendations/practices and revise as necessary	F,P/T *(Lead: PPHB)*
		› Implement protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages	P/T,L
		› Review/implement mechanisms for coordinating patient transport and tracking/managing beds e.g., central bed registries, call centre and centralized ambulance dispatch	P/T,L
		› Access sources of additional HCWs and volunteers i.e., Emergency Measures Organizations and NGOs (Red Cross, St. John ambulance)	F,P/T,L *(Lead: PPHB)*
		› Acquire extra supplies needed to provide medical care in non-traditional sites and open non-traditional sites as needed	P/T,L
		› Co-ordinate clinical care and health services activities with bordering jurisdictions to avoid migration to centres of perceived enhanced services	P/T,L
		› Implement strategy for tracking of recovered, presumably immune, cases	

Phase 1	Pandemic confirmed		
Component	Focus	Actions	Response Level
Emergency Services	Mitigation of potential health care and societal disruption due to pandemic activity/ public fear of influenza	› Open emergency operation centres	F,P/T
		› Activate plans to provide food, medical and other essential life-support needs for persons confined to their homes by choice or by direction from P/T/L health officials	F,P/T P/T,L
		› Assist with preparation and operation of alternate care sites, and other "over-flow" facilities	F,P/T,L
		› Consider travel advisories within Canada	F,P/T *(Lead: CCMOH)*
Public Health Measures	Implementation of public health response	› Evaluate interventions and revise recommendations as necessary	F,P/T,L
		› Integrate national recommendations for isolation into practice at the local level	P/T,L
		› Implement use of mandatory isolation orders if necessary	F,P/T
		› Review/update/disseminate national recommendations regarding containment strategies (i.e., cancellation of public gatherings, school closures)	P/T,L
		› Monitoring/tracking of compliance with containment recommendations	F,P/T,L
		› Participate in strategy for tracking recovered, presumably immune, cases	P/T,L
		› Development/updating of educational materials for the public and health care providers as the pandemic evolves	F,P/T,L *(Lead: PIC)*

Phase 1	Pandemic confirmed		
Component	**Focus**	**Actions**	**Response Level**
Communications	Ongoing communication with stakeholders and public	› Institute daily conference calls of the HECN, ensure it is integrated with PIC meetings	F *(Lead: Office for Crisis Communications, HC)*
		› Ongoing communication with global partners	F
		› Ongoing communications with media, partners and public	F,P/T,L
		› Establishment of joint website/linkages	F,P/T,L
		› Launch multi-media campaign targeting specific target groups including the general public, health care workers and local community support networks	F *(Lead: Office for Crisis Communications, HC)*
		› Stage joint media and stakeholder briefings with representatives of Health Canada, relevant P/T officials, CMOH rep, etc.	F,P/T,L *(Lead: Office for Crisis Communications, HC)*
		› Updating of public resources	F,P/T,L

Phase 2	Outbreaks in multiple geographic areas (within Canada)		
Component	Focus	Actions	Response Level
Surveillance	Provision of up-to-date epidemiological data on evolving pandemic	› Collect/compile/distribute epidemiologic data from involved country (s) and jurisdictions within Canada	F *(Lead: PPHB)*
		› Revise surveillance case definitions as necessary	F,P/T *(Lead: PIC)*
		› Monitor surveillance activities; compile and report outcomes	F,P/T *(Lead: PPHB)*
		› Monitor and modify (if necessary) data collection/transmission processes/protocols	F,P/T,L
		› Monitor and report on progress of implemented special studies	F,P/T,L *(Lead: PPHB and/or CIHR)*
Vaccine Programs	Vaccine Development Preparation / Implementation of mass immunization clinics	› Ongoing involvement in vaccine development/testing/production initiatives	F *(Lead: PPHB, HPFB, manufacturers)*
		If vaccine is available... (see Phase 1 above)	
		› Collect and compile reports of total people immunized with one and/or two doses	F,P/T,L
		› Ongoing VAAE surveillance	F,P/T,L
		› Monitoring of vaccine supply, demand, distribution and uptake	F,P/T
		› Recruitment of trained immunization staff from unaffected jurisdictions to ease demand in affected areas	F,P/T
Antivirals	Strategic use of antiviral drugs	› Ongoing consideration of antiviral use based on priority groups, available supplies and local epidemiology	F,P/T,L
		› Monitoring of antiviral availability, demand, distribution and uptake	F,P/T *(Lead: HPFB)*
		› Monitoring for antiviral resistance	F,P/T,L
		› Ongoing monitoring for adverse drug reactions	F,P/T,L

Phase 2	Outbreaks in multiple geographic areas (within Canada)		
Component	**Focus**	**Actions**	**Response Level**
Health Services	Management of increased demand on health care system	› Consider prioritization of laboratory services across different jurisdictions in order to accommodate high-service demands and staff and supply shortages	P/T,L
		› Open additional alternative sites for medical care as required	F,P/T,L
		› Monitor capacity of mortuary/burial services, as well as need for social and psychologic services for families of victims, and implement/establish alternative sites for provision of services as necessary	P/T,L
		› Track national stocks of medications as well as necessary medical equipment and supplies, including ventilators, oxygen, etc. Consider strategies to mitigate shortfalls	F,P/T,L *(Lead: PPHB)*
Emergency Services	Optimal use of available emergency resources	› Determine if international travel advisories are sufficient / still warranted	F *(Lead: PPHB)*
		› Declare a P/T or National state of emergency (if necessary)	F,P/T
		› Evaluate need for use of national stockpile system and distribute supplies as needed	F *(Lead: PPHB)*
		› Evaluate need for military assistance with preparation and operation of alternate care sites, and other "over-flow" facilities	F *(Lead: PPHB)*
Public Health Measures	Optimization of the public health response	› Ongoing evaluation of interventions and revision of recommendations as necessary	F,P/T *(Lead: PIC)*
		› Monitor effectiveness of isolation recommendations and other control measures	P/T,L
		› Review/update/disseminate national recommendations regarding containment strategies (i.e., cancellation of public gatherings, school closures)	F,P/T *(Lead: PIC)*
		› Monitoring/tracking of compliance with containment recommendations	P/T,L
		› Sharing of educational and other resources across jurisdictions	F,P/T,L

Phase 2	Outbreaks in multiple geographic areas (within Canada)		
Component	Focus	Actions	Response Level
Public Health Measures *(continued)*		› Recruitment of trained public health Recruitment of trained immunization staff from unaffected jurisdictions to ease demand in affected areas staff from unaffected jurisdictions to ease demand in affected areas	F,P/T,L
Communications	Ongoing timely communication with stakeholders and public Evaluation of adopted communication strategy	› Ongoing communication with HECN, international organizations and other health partners including NGOs	F *(Lead: Office of Crisis Communications)*
		› Ongoing communications with media, partners and public	F,P/T,L
		› Training of additional communication leads to allow for staff rotation	F,P/T,L
		› Evaluation of implemented communication strategy	F,P/T,L
		› Updating of public resources	F,P/T,L
		› Ensure that all audiences, including media, key opinion leaders, stakeholders, employees are satisfied with the level of communication	F,P/T,L
		› Daily joint briefings of media involving representatives of the implicated organizations	F,P/T

Phase 3	End of first wave		
Component	**Focus**	**Actions**	**Response Level**
Surveillance	Review / evaluation of data and surveillance strategy Ongoing surveillance (especially for un-linked cases)	› Estimate burden of disease during outbreak period	F,P/T
		› Review/modify case definition	F,P/T
		› Determine ongoing surveillance needs for both documentation of end of first wave and detection of any new cases/outbreaks	F,P/T
		› Evaluate active surveillance systems	F,P/T
Vaccine Programs	Vaccine coverage, efficacy and safety	› Ongoing involvement in vaccine development/testing/production initiatives	F *(Lead: PPHB, HPFB, manufacturers?)*
		If vaccine was not available during earlier phases see Phase 1 & 2 above. **If vaccine was available and administered in earlier phases…**	
		› Expansion of vaccine programs to cover population not yet immunized	P/T,L
		› Summarize and report coverage data (with one and/or two doses) and VAAE data	F,P/T
		› Examine vaccine efficacy	F *(Lead: PPHB)*
		› Ongoing VAAE surveillance	F,P/T,L
		› Restocking of supplies and resumption of routine programs	P/T,L
		› Review/revise guideline and/or protocols used during the mass campaigns	F,P/T,L
Antivirals	Evaluation of antiviral use (if applicable)	› Perform inventory assessment and ongoing monitoring of antiviral availability	F,P/T,L
		› Evaluate effectiveness of strategic antiviral use (in Canada and/or based on international reports)	F,P/T
		› Summarize and report antiviral resistance data	F,P/T *(Lead: PPHB)*
		› Summarize and report adverse drug reaction data	F *(Lead: HPFB)*

Phase 3	End of first wave		
Component	**Focus**	**Actions**	**Response Level**
Health Services	Restocking, evaluation and preparation for next wave	› Review/revise clinical management guidelines	F,P/T *(Lead: PIC)*
		› Review/revise infection control guidelines	F,P/T *(Lead: PIC)*
		› Review/revise guidelines for management of mass fatalities (if applicable)	F,P/T *(Lead: PIC)*
		› Across all health care services (including mortuary) - assess status of stocks, impact of first wave, reorder supplies, and ensure circulation of staff to avoid burnout	P/T,L
		› Closure/reduction in use of "alternate care/over-flow sites"	F,P/T,L
		› Restocking of laboratory supplies and resumption of routine laboratory services	F,P/T,L
		› Develop projections for future laboratory requirements (i.e., human and physical resources including test kits etc.)	F,P/T
		› Summarize/evaluate and report on the use of social and psychologic services for families of victims	P/T,L
		› Track national stocks of medications as well as necessary medical equipment and supplies, including ventilators, oxygen, etc. Consider strategies to mitigate shortfalls in next wave	F,P/T *(Lead: PPHB)*
Emergency Services	Restocking, evaluation and preparation for next wave	› Review/revise travel advisories	F *(Lead: PPHB)*
		› Assess need for ongoing state of emergency (if applicable) and criteria for ending the state of emergency	F,P/T *(Lead: PPHB)*
		› Evaluate use of national stockpile system (if applicable) and restock supplies as needed	F *(Lead: PPHB)*
		› Evaluate need for ongoing military assistance with operation of alternate care sites, and other "over-flow" facilities	F *(Lead: PPHB)*
		› Review/revise emergency plans	F,P/T,L

Phase 3	End of first wave		
Component	**Focus**	**Actions**	**Response Level**
Public Health Measures	Evaluation and preparation for next wave	› Review/revise public health management guidelines	F,P/T *(Lead: PIC)*
		› Document and report lessons learned	F,P/T,L
		› Update educational materials	F,P/T,L
		› Resume routine public health activities/programs	F,P/T,L
		› Promote immunization for influenza and other secondary infections observed during the first wave (if appropriate and applicable)	P/T,L
		› Disseminate all revised guidelines to appropriate stakeholders	F,P/T,L
		› Evaluate the effectiveness of public health measures (e.g., closure of schools or other institutions etc.)	F,P/T,L
Communications	Evaluation of communication activities	› Evaluate communication strategy	F,P/T,L
		› Update public education materials and scripts for phone line staff	F,P/T,L
		› Scale back staffing as need diminishes	F,P/T,L

Phase 4	Second or later waves		
Component	**Focus**	**Actions**	**Response Level**
Surveillance	Early detection of second wave	› Ongoing surveillance › As per Phases 1&2	F,P/T,L
Vaccine Programs	Immunization of the non-immune	› Ongoing involvement in vaccine development/testing/production (if applicable) **If vaccine is available...** › As per Phases 1&2, immunization of non-immune population	F *(Lead: PPHB, HPFB, Manufacturers)*
Antivirals	Strategic and controlled use of available antiviral drugs	› Based on local epidemiology and available supplies, and lessons learned from previous wave (s), recommend administering antiviral prophylaxis and treatment to priority groups › As per Phases 1&2	F, PT *(Lead: PIC)*
Health Services	Gearing up to meet increasing demands and control of spread	› Implement activities as per updated guidelines › As per Phases 1&2	F,P/T,L
Emergency Services	Optimal use of emergency resources	› As per Phases 1&2	
Public Health Measures	Efficient and Strategic public health response	› As per Phases 1&2, building on lessons learned	
Communications	Ongoing communication with stakeholders and public	› As per previous phases	

Phase 5	Post-pandemic/recovery		
Component	**Focus**	**Actions**	**Response Level**
Surveillance	Review, evaluation and return to routine operations	› Resume routine ongoing laboratory and disease surveillance › Estimate burden of disease during outbreak periods	F,P/T,L F,P/T
Vaccine Programs	Review, evaluation, resumption of routine programs	› Provide recommendations for routine prevention and control including recommendations for vaccines	F,P/T *(Lead: PIC/NACI)*
Antivirals	Review and evaluation	› Provide recommendations for the strategic use of antivirals during a pandemic based on lessons learned within Canada and internationally	F,P/T *(Lead: PIC)*
Health Services	Review, evaluation, return to routine operations	› Review/activate aftercare/recovery plans/guidelines	F,P/T,L
Emergency Services	Review, evaluation, return to pre-emergency activity level	› Review/activate aftercare/recovery plans/ guidelines	F,P/T,L *(Lead: PPHB)*
Public Health Measures	Review, evaluation, resumption of routing programs	› Provide recommendations for routine prevention and control including recommendations for any control measures other than vaccines and antivirals › Provide lessons learned for ourselves and the public and prepare for the next emerging infectious disease	F,P/T *(Lead: PIC)* F,P/T,L
Communications	Review, evaluation, return to routine operations	› Review performance measurement criteria and evaluate response	F,P/T,L

Canadian Pandemic Influenza Plan

Annexes

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A Glossary of Terms and Acronyms

The following glossary of terms refers to terms used throughout the Plan, including the annexes.

A	
ACD	Acute and Communicable Disease Prevention
ACPHHS	Advisory Committee on Population Health and Health Security
Acute	Short term, intense symptomatology or pathology, as distinct from chronic. Many diseases have an acute phase and a chronic phase. This distinction is sometimes used in treatments.
Acute Care	Acute care refers to services provided by physicians and other health professionals and staff in the community and in hospitals. These include emergency, general medical and surgical, psychiatric, obstetric and diagnostic services.
Alternate Level of Care *See also Acute Care, InterQual Criteria*	This term refers to alternative care that, had it been available, would have been more appropriate for a person in an acute care hospital who does not meet the criteria for acute care.
Amantadine	An antiviral agent indicated in adults and children > 1 year for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus.
Antigen	Any molecule that is recognized by the immune system and that triggers an immune response, such as release of antibodies.
Antigenic drift	A gradual change of the hemagglutinin or neuraminidase proteins on the surface of a particular strain of influenza virus occurring in response to host antibodies in humans who have been exposed to it. It occurs on an ongoing basis in both type A and type B influenza strains and necessitates ongoing changes in influenza vaccines.
Antigenic shift	The movement of a type A influenza virus strain from other species into humans. The novel strain emerges by reassortment with circulating human influenza strains or by infecting humans directly. Because they flourish in the face of global susceptibility, viruses that have undergone antigenic shift usually create pandemics.
Antibody	Protein molecules that are produced and secreted by certain types of white cells in response to stimulation by an antigen.
Antigen	Any substance that provokes an immune response when introduced into the body.

B	
Bed *(Institutional Bed)*	In any institution a "bed" includes infrastructure support, including staffing, which is required to care for the patient in that "bed". Therefore the requirements for a "bed" in an intensive care unit, for example, include all the support required for a patient to be cared for at that level.

C	
Case Weight	A measure representing the relative resources consumed by different types of hospital cases, distinguishing simple from complex cases. (See Resource Intensity Weights).
CCRA	Canada Customs and Revenue Agency
CDC	Centers for Disease Control and Prevention – an American federal agency of the HHS
CDPE	Center for Disease Prevention and Epidemiology - OHS
CEPR	Centre for Emergency Preparedness and Response
CIDPC	Centre for Infectious Disease Prevention and Control
CMOH	Chief Medical Officer of Health
CPIP	Canadian Pandemic Influenza Plan
Cross-resistance	The development of strains of a pathogen that not only withstands the effects of a given antimicrobial agent, but other chemically related agents as well.
CSIS	Canadian Security Intelligence Service

D	
DND	Department of National Defence

E	
Epidemic	An outbreak of infection that spreads rapidly and affects many individuals in a given area or population at the same time.
Epidemiology	The study of epidemics and epidemic diseases
EOC	Emergency Operations Centre
ERAP	Emergency Response Action Plan
ERP	Emergency Response Plan

F	
Flu	Another name for influenza infection, although it is often mistakenly used in reference to gastrointestinal and other types of clinical illness.
F/P/T	Federal/Provincial/Territorial

G	
Goblet cell	A mucous gland in the epithelial lining of specific mucus-secreting passages of the respiratory tract. Mucigen droplets swell the upper portion of the cell, giving it a goblet-like shape.

H	
H1N1	A strain of influenza type A virus that caused the pandemic infection of 1918 1919 and that continues to circulate in humans. H3N2 A strain of influenza type A virus that caused the pandemic infection of 1968 1969. Of the three influenza viruses that currently circulate in humans, this type causes the greatest morbidity and mortality.
H5N1	A strain of influenza type A virus that moved in 1997 from poultry to humans. While the outbreak of this virus was rapidly contained, it produced significant morbidity and mortality in persons who became infected, probably from direct contact with infected poultry.
Health Care Workers *(Pandemic)*	Health Care Workers are professionals, including trainees and retirees, nonprofessionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services. For the purposes of this definition, Health Care Workers are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work. This group would also include public health professionals during the pandemic.
Health Status	The state of health of an individual or a population, as in community health status.
Hemagglutinin	An agglutinating protein antigen spiking from the surface of the influenza virus. Differences in the amino acid sequencing of the HA antibody give rise to the different subtypes of type A virus.
HERT	Health Emergency Response Team
High-Risk Groups	Those groups in which epidemiologic evidence indicates there is an increased risk of contracting a disease.

I	
Inactivated vaccine	A vaccine prepared from killed viruses, which no longer retain their infective properties.
Infection	Condition in which virulent organisms are able to multiply within the body and cause a response from the host's immune defences. Infection may or may not lead to clinical disease.
Infectious	Capable of being transmitted by infection, with or without actual contact.
Influenza	A highly contagious, febrile, acute respiratory infection of the nose, throat, bronchial tubes, and lungs caused by the influenza virus. It is responsible for severe and potentially fatal clinical illness of epidemic and pandemic proportions.
Influenza type A	A category of influenza virus characterized by specific internal proteins and further subgrouped according to variations in their two surface proteins (hemagglutinin and neuraminidase). It infects animals as well as humans and has caused the pandemic influenza infections occurring in this century.
Influenza type B	A category of influenza virus characterized by specific internal proteins. It infects only humans, causes less severe clinical illness than type A, and spreads in regional rather than pandemic outbreaks.
Influenza type C	A category of influenza virus characterized by specific internal proteins. It does not cause significant clinical illness.
Inpatient	An individual who receives health care services while admitted in a health care facility overnight or longer.
Isolate	A pure specimen obtained by culture.
InterQual Criteria *(See also Alternate Level of Care)*	A set of measurable clinical indicators, as well as diagnostic and therapeutic services, reflecting the need for hospitalization. Rather than being based on diagnosis, they consider the level of illness of the patient and the services required; thus they serve as the criteria for all acute hospital care, regardless of location or size of the hospital. The criteria are grouped into 14 body systems, and there are three sets of criteria for each body system: Severity of Illness, Intensity of Service, and Discharge Screens.

J	
JBCRT	Joint Biological Chemical Response Team
JTF2	Joint Task Force 2

L	
Licensed Practical Nurse (LPN)	A nursing school graduate who has been licensed by a provincial/territorial body; occasional synonym, licensed vocational nurse (LVN).
Low Income Cutoff Point (LICO)	The proportion of people in low-income households to the total population in private households. LICOs are set where families spend 20 percent more of their pre-tax income than the Canadian average on food, shelter and clothing. The LICO takes into account changes in the Consumer Price Index of the area and gives various LICOs according to different family sizes.

M	
MD *(Doctor of Medicine)*	An individual holding a doctoral degree in medicine.
Mean *(statistical)*	Commonly referred to as the "average", the mean of a set of quantities is the sum of the quantities, divided by the number of quantities summed.
Median *(statistical)*	The value such that for a series of ranked quantities, one half are above the median, and one half are below.
MEDLARS	Medical Literature Analysis Retrieval System: The computer on which "Medline" and "AIDS Line" reside at the National Library of Medicine.
MEDLINE	Medical Literature Analysis Retrieval System On-Line. A computer searchable database of published medical literature.
MOH	Medical Officers of Health
Morbidity	Departure from a state of well-being, either physiologic or psychologic illness.
Morbidity Rate	The number of cases of an illness (morbidity) in a population divided by the total population considered at risk for that illness.
Mortality	Death, as in expected mortality (the predicted occurrence of death in a defined population during a specific time interval).
Mortality Rate	The number of people who die during a specific time period divided by the total population.
MOU	Memorandum of Understanding
Mutation	A permanent, transmissible change in the genetic material of a cell.

N

NACI	National Advisory Committee on Immunization
NBC	Nuclear, Biological, Chemical
NESS	National Emergency Stockpile System
Neuraminidase	A hydrolytic protein antigen spiking from the surface of the influenza virus. It dissolves the protective viscosity of cellular mucous lining, allowing release of new viruses into the respiratory tract.
Neuraminidase inhibitors	A new class of antiviral agents that selectively inhibit neuraminidase activity in both influenza type A and type B viruses, while having no effect on human neuraminidase
NML	National Microbial Laboratory
NML4	National Microbial Laboratory Level 4
Non-traditional Site	The following is a definition of a Non-traditional Site for the purposes of Pandemic Influenza planning: A Non-traditional Site is a site offering care for influenza patients. These sites are currently not an established health care site, or are established sites which usually offer a different type or level of care. The Functions of an Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients.

O

OCIPEP	Office of Critical Infrastructure and Protection and Emergency Preparedness
Opportunistic Infections	An infection in an immune compromised person caused by an organism that does not usually cause disease in healthy people. Many of these organisms are carried in a latent state by virtually everyone, and only cause disease when given the opportunity of a damaged immune system.
Outpatient	An individual who receives health care services without being admitted to a health care facility.

P	
PAHO	Pan American Health Organization
Palliative	A treatment which provides symptomatic relief, but not a cure.
Pandemic	Referring to an epidemic disease of widespread prevalence around the globe.
Parenteral	Not through the mouth. Intravenous, intramuscular, and intradermal administration are all parenteral.
Pathogen	Any disease-producing microorganism or material.
Pathogenesis	The natural evolution of a disease process in the body without intervention (i.e., without treatment); Description of the development of a particular disease, especially the events, reactions and mechanisms involved at the cellular level.
PCR *(Polymerase Chain Reaction)*	A highly sensitive test that can detect and/or DNA fragments of viruses or other organisms in blood or tissue. PCR works by repeatedly copying genetic material using heat cycling, and enzymes similar to those used by cells.
Pediatric	Relating to the medical specialty concerned with the development, care and treatment of children from birth through adolescence.
Pneumocyte	An alveolar epithelial cell in the lungs.
Potential Years of Life Lost (PYLL)	The PYLL rate per 1000 population is the ratio of the total years of life lost between ages 0 and 75 due to a specific cause to the total population. The cause of death selected is the underlying cause of death, which is the cause that initiated the sequence of events leading to death.
Preventive Care	A comprehensive type of care emphasizing priorities for prevention, early detection and early treatment of conditions, generally including routine physical examinations, immunization, and well-person care.
Preventive Medicine	Taking measures for anticipation, prevention, detection, and early treatment of disease.
Primary Care	Primary care is the first level of care, and usually the first point of contact, that people have with the health care system. Primary care involves the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community. It includes advice on health promotion and disease prevention, assessments of one's health, diagnosis and treatment of episodic and chronic conditions, and supportive and rehabilitative care.
P/T	Provincial/Territorial

Public Health	The art and science of protecting and improving community health by means of preventive medicine, health education, communicable disease control, and the application of social and sanitary sciences.
P Value	The probability of obtaining a given outcome due to chance alone. For example, a study result with a significance level of $p < 0.05$ implies that 5 times out of 100 the result could have occurred by chance.

Q	
QTMH	Quarantine, Travel and Migration Health
Qualitative	Of, relating to, or expressed in relative or subjective terms‹impossible to precisely quantify.
Quantitative	Of, relating to, or expressed in terms of quantity.

R	
Raw Data	Measurements and observations recorded on study data forms. Unedited computer-generated listings of data from study data forms, prior to use of reduction and summary procedures needed for data analysis.
RCMP	Royal Canadian Mounted Police
Record	A paper or electronic document that contains or is designed to contain a set of facts related to some occurrence, transaction, or the like.
Registered Nurse (RN)	One who has graduated from a college or university program of nursing education and has been licensed by the state.
Resistance	The development of strains of a pathogen that are able to withstand the effects of an antimicrobial agent.
Respiratory epithelium	The pseudostratified coverup of internal body surfaces, which lines all but the finer divisions of the respiratory tract.
Respiratory tract	Structures contained in the respiratory system, including the nasopharynx, oropharynx, laryngopharynx, larynx, trachea, bronchi, bronchioles, and lungs.
Rimantadine	An antiviral agent indicated in adults for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus.

S	
SARS	Severe Acute Respiratory Syndrome
Secondary Care	Services given by a specialist, normally after a referral from a primary care physician, and often in an acute care hospital. It does not include the services of specialists whose services are only available in major urban centres; this level of service would normally be considered Tertiary Care.
Significance *(statistical)*	Infers that an observation was unlikely to have occurred by chance alone. Statistical significance is often based on a *p* value < 0.05. Below this level, the smaller the p value, the greater the statistical significance.
Standard Deviation *(statistical)*	A statistic that shows the spread or dispersion of scores in a distribution of scores (i.e., a measure of dispersion). The more widely the scores are spread out, the greater the standard deviation. Standard deviation = the square root of the variance.
Statistics, Descriptive	The intent of descriptive statistics is to summarize and present data, e.g., measures of central tendency (mean, mode, median) and measures of variability (standard deviation, variance, standard error of the mean).
STD	Sexually Transmitted Disease
Strain	A group of organisms within a species or type that share a common quality. For example, currently circulating strains of influenza include type A (H1N1), type A (H3N2), and type B (H3N2).
Subacute Care	Comprehensive, cost-effective inpatient level of care for patients who: a) have had an acute event resulting from injury, illness or exacerbation of a disease process, b) have a determined course of treatment and, c) though stable, require diagnostics or invasive procedures but not intensive procedures requiring an acute level of care. Typically short term, subacute care is designed to return patients to the community or transition them to a lower level of care. Subacute care is offered in a variety of physical settings. The philosophy of subacute care is to ensure that patients are receiving the most appropriate services at the most appropriate phase of their illness while ensuring quality, cost-effective outcomes.
Subtype	A classification of the influenza type A viruses based on the surface antigens hemagglutinin (H) and neuraminidase (N).
Symptoms	Any perceptible, subjective change in the body or its functions that indicates disease or phases of disease, as reported by the patient.

T	
Toxicity	The extent, quality, or degree of being poisonous or harmful to the body.
Toxin	A harmful or poisonous agent.
Triage	A system whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors.
Type	A classification of influenza viruses based on characteristic internal proteins.

V	
Vaccination	The act of administering a vaccine.
Vaccine	A substance that contains antigenic components from an infectious organism. By stimulating an immune response (but not disease), it protects against subsequent infection by that organism.
VAER	Vaccine Adverse Events Reporting
Virology	The study of viruses and viral disease.
Virus	A group of infectious agents characterized by their inability to reproduce outside of a living host cell. Viruses may subvert the host cells' normal functions, causing the cell to behave in a manner determined by the virus.
Volunteers *(Pandemic)*	A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support Canada prepare for and respond to a Pandemic Influenza outbreak. A volunteer is one who offers their service of their own free will, without promise of financial gain, and without economic or political pressure or coercion.

W	
WHMIS	The Workplace Hazardous Materials Information System (WHMIS) is Canadian legislation covering the use of hazardous materials in the workplace. This includes assessment, signage, labelling, material safety data sheets and worker training. WHMIS closely parallels the U.S. OSHA Hazcom Standard. Most of the content of WHMIS is incorporated into Canada's Hazardous Products Act and the Hazardous Materials Information Review Act which are administered by Health Canada. Certain provincial laws may also apply. Enforcement of WHMIS is performed by the Labour Branch of Human Resources Development Canada or the provincial/territorial OHS agencies.
Wild type	A naturally occurring strain of virus that exists in the population.
World Health Organization (WHO)	A specialised agency of the United Nations generally concerned with health and health care.

B Pandemic Influenza Planning Considerations in First Nations Communities

The Canadian Pandemic Influenza Plan provides a framework for the preparedness and response to a pandemic influenza outbreak. This framework will guide the planning in all jurisdictions including First Nations (FN) communities on reserve.

Annex B outlines some of the unique considerations for the key stakeholders, for the planning and implementation of pandemic influenza preparedness and response in FN communities. This Annex is currently under consultation and will be included in the Canadian Pandemic Influenza Plan once finalized.

The annex contains three sections:

1) The first section will describe the current delivery of health care in First Nations and Inuit communities and note that delivery of such services is a shared responsibility between federal, provincial and territorial governments. It will also outline the status of pandemic influenza planning in FNIHB Regions and their participation in provincial planning.
2) The second section will outline some of the unique challenges in First Nations communities with respect to preparedness and response to pandemic influenza.
3) The third section will set out the future activities, noting that the management of pandemic influenza in First Nations communities requires a coordinated effort among all key players. It will also outline the activities and expected roles and responsibilities of the different partners to manage effectively and efficiently the potential of pandemic influenza in First Nations communities.

C Canadian Pandemic Influenza Plan: Laboratory Procedures

In this document laboratory testing, surveillance and data collection, and communication issues are addressed for each WHO pandemic phase. The Laboratory Subcommittee has developed this document for pandemic planning purposes and to facilitate a consistent approach to laboratory testing for influenza during the interpandemic period.

WHO Phase 0

Interpandemic Phase

1. Testing

Normal activities to include virus isolation by cell culture, direct antigen testing, and serology. The Laboratory Sub-committee encourages the use of rapid detection methods in conjunction with cell culture to aid in the timely diagnosis of influenza particularly in outbreak situations. The nasopharyngeal swab is generally recommended as the preferred specimen as it gives the best results in most direct detection kits as well as in tissue culture. However, other specimens such as throat swabs or nasopharyngeal washings may be acceptable or recommended by specific kit manufacturers.

Participation in the National Microbiology Laboratory (NML) proficiency programme is required for all laboratories performing cell culture and/or serology for influenza.

Up to 10% of all season influenza isolates, including at least five early season, five late season, and any unusual isolates, must be sent to the NML for viral sub-typing. These isolates must be submitted to the NML promptly, along with the results of any sub-typing done locally. The NML should give priority to processing these specimens. NML will report results of sub-typing to the submitting lab within a few days of receipt. All laboratories performing cell culture for influenza are expected to submit isolates for sub-typing as described above unless otherwise directed by NML.

Susceptibility testing will be performed on early season and late season isolates as appropriate, as well as others agreed upon by the NML, in conjunction with the provincial laboratory.

The NML will transfer subtyping and susceptibility-testing technology to selected Provincial Health Laboratories (PHLs) as appropriate.

The NML will develop rapid test(s) for detection of influenza, better sub-typing and molecular and susceptibility methods, and offer training in these methods to PHLs as appropriate.

2. Surveillance and data collection

All testing labs must submit data on influenza testing to NML on a weekly basis, or more frequently if requested by the NML, during the influenza season. This data is reported on 'FluWatch' and accessible through the Health Canada and CPHLN websites.

Enhanced surveillance using sentinel physicians, and including laboratory testing, may be set up by NML in collaboration with local public health epidemiologists and provincial laboratories.

3. Communication

Enhanced communication must be set up by the CPHLN secretariat[1] to link the NML, PHLs and provincial epidemiologists using the CPHLN[2] website, email, fax and phone / teleconference communication. An up-to-date listing of laboratories must be maintained by NML and CPHLN.

Each province should have in place an influenza surveillance committee to ensure good communication between provincial epidemiologists, the provincial laboratory and the health units. The committee will deal primarily with influenza in the event of a pandemic, but will deal with other surveillance issues at other times as required. The committee should include (at a minimum) a provincial epidemiologist, the provincial laboratory director or designate, and the chief medical officer of health or designate.

4. Other

Laboratories will participate in regular disaster drills at the request of the National Pandemic Influenza Committee to test the plan and identify areas that need further attention.

WHO Phase 0, Level 1, 2

Novel Influenza Subtype Identified in One or More Human Cases

1. Testing

As in Phase 0.

Increased testing (particularly cell culture) to be encouraged to detect new virus rapidly. The NML to give priority to reagent preparation for the identification of the new strain in readiness for phase 2.

2. Surveillance and data collection

As in Phase 0 with heightened surveillance as determined by the NML and the Pandemic Influenza Committee.

3. Communication

Information from WHO, CDC, NML, or laboratories from areas affected by the new virus (information such as subtype, best cell lines to use, usefulness of direct testing, susceptibility pattern, morbidity, mortality, etc.) to be rapidly disseminated to PHLs by CPHLN secretariat using the CPHLN website, fax, email or telephone, depending on the circumstances.

PHLs will ensure that other testing labs in province are kept informed.

Meetings, teleconference of the laboratory subcommittee or the PHLs, will be coordinated as required by the CPHLN secretariat.

WHO Phase 0, Level 3

Canadian Human-to-Human Transmission Confirmed

1. Testing

   Increased testing (culture) will be required to detect the first isolate of the pandemic strain in Canada. Additional supplies of appropriate cell lines may be required.

   NML will provide to PHLs reagents for identification of the pandemic virus, advise on cell lines, use of rapid test methodologies and biosafety level required etc.

   Rapid sub-typing of isolates will be performed by NML and designated PHLs.

   Note that supplies, including cell lines, test kits, and reagents may be in short supply as other North American labs gear up as well. NML should consider in house production of alternate sources of reagent. Also PHLs currently producing their own cells might act as suppliers to other PHLs temporarily.

2. Surveillance and data collection

   As in Level 1 and 2 with heightened surveillance as determined by the NML and the Pandemic Influenza Committee

3. Communication

   NML to rapidly inform labs of first identification of pandemic strain in North America *via* CPHLN, CPHLN website, CPHLN listserv fax, email, or telephone as appropriate.

   NML to keep PHLs informed *via* CPHLN, CPHLN website, CPHLN listserv, fax, email, telephone re: activity of new virus, keep updated on cell lines, direct test methods which can be used. The PHLs will rapidly communicate via NML their first isolate of pandemic strain, as well as any other local influenza activity.

   PHLs to ensure other testing labs in province are kept informed.

WHO Phase 1,2,3

Pandemic in Canada

1. Testing

   The PHLs will be handling increased testing during this phase of pandemic; they will need to redirect resources to give priority to influenza testing. Each laboratory will decide how to ensure influenza testing gets priority (e.g., restricted testing of other specimens, additional staffing, etc.)

   Biosafety level required will be reassessed by NML and CPHLN using information from WHO and CDC.

   Rapid sub-typing of isolates by NML (and designated PHLs).

   Susceptibility testing of strains as determined by NML in collaboration with the PHLs.

2. Surveillance and data collection

   Continued heightened surveillance as in Phase 1 and 2.

3. Communication

As in Phase 0

NML will rapidly inform the PHLs of the first appearance of pandemic strain in Canada.

NML will collaborate with the provinces to notify bacteriology testing labs to prepare for an increase in testing for bacterial pneumonia (i.e., strategy for monitoring types of organisms, susceptibility patterns, and best antibiotics to use).

WHO Phase 4

Second or Later Waves in Canada

1. Testing

PHLs may have to restrict testing of specimens for influenza. The Laboratory Subcommittee to give guidelines on testing, depending on antiviral susceptibility of pandemic strain and other co-circulating strains.

2. Surveillance and data collection

As in Phases 1 – 3.

3. Communication

As in Phases 2 and 3.

The NML will keep the PHLs informed of influenza activity across the country, changes in susceptibility, other circulating strains, morbidity/mortality information, etc.

WHO Phase 5

Post-pandemic Period in Canada

Return to pre-pandemic activities.

Revised: Oct 14/03

1. The reason for using the CPHLN secretariat and the CPHLN website is because of the secretariat's role in communication among all PHLs and the NML as well as with CIDPC and others.
2. The CPHLN website is a more appropriate tool because its website does not dilute critical lab-related issues with other concerns. The CPHLN website will deliver specific-up-to-date and real-time lab info as a one-stop-shopping-for-lab-information site. This site can be accessed by anyone who will need access. This does not exclude the use of HC website, but www.cphln.ca would be faster for laboratory personnel by design.

D Recommendations for Pandemic Vaccine Use in a Limited Supply Situation

Priorities for vaccination need to be established during the interpandemic period in order to facilitate planning for an efficient and consistent pandemic immunization strategy. In keeping with the overall goal of pandemic response, the prioritization process must consider the impact the vaccine will have on: 1) reducing morbidity and mortality by maintaining the health services response and by individual protection of high risk groups, and 2) minimizing societal disruption by maintaining the essential services upon which everyone depends. The pandemic vaccine will become available in lots and supply is likely to be limited during the early stage of the pandemic in Canada. Furthermore it is likely that two doses of vaccine will be required to achieve a protective response in the vaccinee. Therefore, when vaccine becomes available it is essential that it be distributed in a pre-defined equitable and consistent manner across all provinces and territories.

The Vaccines Working Group has developed the following recommendations for the use of vaccine in a limited supply situation to provide guidance to PIC and those involved in pandemic planning at the F/P/T and local levels. **The priority groups will need to be reassessed, and possibly altered, as soon as epidemiologic data on the specific pandemic virus becomes available to ensure that they are consistent with the overall goal of the pandemic response**. Once data on the epidemiology of the pandemic becomes available, the PIC will be the lead in the final identification and prioritization of population groups to receive influenza vaccine. These recommendations will be distributed as national guidelines as soon as possible, with the expectation that they will be followed by all jurisdictions in order to ensure a consistent and equitable program.

Recommended Priority Groups

The estimates of population size made for each group are based on 1998 data. Each jurisdiction is encouraged to develop their own estimates for these priority groups as a part of their pandemic planning activities.

Group 1: Health care workers, paramedics/ambulance attendants and public health workers (approximately 600,000)

Rationale: The health care and public health sectors will be the first line of defence in a pandemic. Maintaining the health service response and the vaccine program is central to the implementation of the response plan, in order to reduce morbidity and mortality. Health services workers may be considered in the following work settings for vaccine program planning:

- acute care hospitals
- long term care facilities/nursing homes
- private physicians' offices
- home care and other community care facilities
- public health offices
- ambulance and paramedic services
- pharmacies
- laboratories

Group 2: Essential service providers (approximately one million)

Rationale: The ability to mount an effective pandemic response may be highly dependent on persons, within the groups listed below, being in place to maintain key community services. Those individuals that are essential to the response or to maintaining key community services may vary between jurisdictions. Local plans will likely reflect these differences, however they are likely to include:

- police
- fire-fighters
- the armed forces
- key emergency response decision makers (e.g. elected officials, essential government workers and disaster services personnel)
- utility workers (water, gas, electricity and essential communications systems)
- funeral service/mortuary personnel
- people who work with institutionalized populations (e.g., corrections)
- persons who are employed in public transportation and the transportation of essential goods (such as food)

Vaccine eligibility criteria should be defined based on the work/duties the individual performs rather than position label.

Group 3: Persons at high-risk of severe or fatal outcomes following influenza infection

Rationale: To meet the goal of reducing morbidity and mortality, persons most likely to experience severe outcomes should be vaccinated. For planning purpose we have based this priority group on the high risk groups identified by the National Advisory Committee on Immunization (NACI) for annual vaccine recommendations. Additional groups have also been included based on evidence indicating an elevated risk. For example, during the annual epidemics, young infants experience rates of hospitalization similar to the elderly.

Prioritization of the following subgroups within Group 3 would depend on the epidemiology of influenza disease in the time of a pandemic.

A: persons in nursing homes, long-term care facilities, homes for the elderly e.g. lodges (approximately 200,000);

B: persons with high-risk medical conditions living independently in the community (approximately 7 million);

C: persons over 65 years of age living independently and not included in 3A and 3B (approximately 1 million);

D: children 6 months to 23 months of age (current vaccines are not recommended for children under 6 months of age);

E: pregnant women * (approximately 200,000).

*Currently, NACI does not consider pregnant women as a high risk group in its recommendations for annual influenza vaccination. However, in a pandemic, pregnant women may be at elevated risk.

Group 4: Healthy adults (approximately 8.7 million)

Rationale: This group is at lower risk of developing severe outcomes from influenza during annual epidemics but is the major work force and represent the most significant segment of the population from an economic impact perspective. Vaccination of healthy adults would reduce demand for medical services and allow individuals to continue normal daily activities. Simultaneous absence of large numbers of individuals from their site of employment could produce major societal disruption even in non-essential personnel. Medical facilities could also be overwhelmed by demand, even for outpatient services. This might compromise care of those with complications.

Group 5: Children 24 months to 18 years of age

Rationale: This group is at the lowest risk of developing severe outcomes from influenza during annual epidemics but play a major role in the spread of the disease. While children's absence from school might not have the direct economic and disruptive impact of illness in adults, it could have that effect indirectly, since care for ill children would be required.

A decision to vaccinate healthy adults and healthy children (Groups 4 and 5) depends on having an adequate supply of vaccine. A much larger amount of vaccine would need to be used to prevent hospitalization and death than for older persons and those with underlying conditions, because of demographic considerations and differences in risks.

Consideration was given to prioritizing the family members of health care workers, however the decision was made that separating out these individuals would not be logistically feasible or ethically justifiable.

E Planning Recommendations for the Use of Antivirals (Anti-Influenza Drugs) in Canada During a Pandemic

Background

General Considerations

Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and could have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response, given that vaccine is unlikely to be available for the early months of a pandemic. Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines.

Current supplies of antivirals, both within and outside of Canada, are very limited. At this time there is limited "routine" use of these drugs in Canada during annual influenza seasons; therefore providing little incentive for manufacturers to store significant amounts of these products in Canada. The issue of security of supply for a pandemic situation needs to be addressed during planning activities.

Prior to the 1997 Hong Kong avian influenza incident, antivirals were not considered as a component of the Canadian pandemic response, in light of costs and other factors. During the Hong Kong outbreak, several countries rapidly depleted global supplies of anti-influenza drugs. In light of the lessons learnt since 1997, and the licensure of new antivirals, the neuraminidase inhibitors, the Antivirals Working Group of the Pandemic Influenza Committee was formed to develop options, recommendations and guidelines for the use of antivirals.

The first "Pandemic Influenza Antiviral Drugs Supply Options" paper was developed in January 1999. This current document contains recommendations that were developed by the Antivirals Working Group in June 2000 and were updated in March 2002 and January 2003.

Classes of Antivirals (Anti-Influenza Drugs)

Two classes of antivirals are currently available in Canada and have a role in the prevention and treatment of influenza infection: M2 ion channel inhibitors (cyclic amines) and neuraminidase inhibitors. There are important differences in pharmacokinetics, side effects and drug resistance between these two classes of antivirals. Such performance characteristics and costs should be considered in selecting the specific drugs to be used for prophylaxis or treatment.

1. **M2 Ion Channel Inhibitors (Cyclic Amines or Adamantanes)**

   M2 ion channel inhibitors interfere with the replication cycle of influenza A but are not effective against influenza B. Amantadine and rimantadine are examples of M2 ion channel inhibitors. Currently, only amantadine is licensed in Canada. Amantadine is approved in Canada for both prophylaxis and treatment of infection due to influenza A. Amantadine is approximately 70-90% effective in preventing illness from influenza A infection.

   When administered within 2 days of illness onset, it can reduce the duration of uncomplicated influenza A illness by approximately one day but it has not been shown to reduce the complications of influenza. Resistance to amantadine has been shown to develop rapidly when this drug is used for treatment purposes.

The Antivirals Working Group will be investigating the potential role of rimantadine for both prophylaxis and treatment during a pandemic, including whether special permission could be obtained to use this drug if it is not licensed in Canada at the time of the pandemic.

2. **Neuraminidase Inhibitors**

   Zanamivir and oseltamivir are examples of neuraminidase inhibitors. These drugs interfere with replication of both influenza A and B viruses in three ways: (1) they interfere with the release of virus from infected cells, (2) they cause the aggregation of virus, and (3) they may improve the inactivation of virus by respiratory mucous secretions. The drugs are well tolerated and have been used effectively for the prophylaxis and treatment of influenza A and B infections. When administered within 2 days of illness onset, zanamivir and oseltamivir can reduce the duration of uncomplicated influenza A and B illness by approximately 1 day. Further evidence is needed on their effectiveness in reducing complications of influenza. Recent community studies suggest that both drugs are similarly effective in preventing febrile laboratory-confirmed influenza illness (efficacy: zanamivir 84%; oseltamivir 82%). Both drugs were licensed in Canada in 1999 for the treatment of infection due to either influenza A or B virus. Since December 2003, oseltamivir has been approved for influenza prophylaxis in Canada. Zanamivr is not licensed for prophylaxis. Current evidence suggests that the development of resistance during treatment of influenza is less likely with neuraminidase inhibitors than with amantadine. Neuraminidase inhibitors are much more expensive than amantadine at this time.

Recommendations of the Antivirals Working Group

The following is a list of recommendations that may assist with planning of the antivirals component of a pandemic influenza response plan.

1. Endorse the goal of influenza pandemic planning as follows:

   First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic

2. Vaccines, if and when available, should be considered the first line for prevention of pandemic influenza.
3. Security of supply for antiviral drugs should be considered as part of planning in the pre-pandemic period.
4. The F/P/T governments should control the supply and distribution of available anti-influenza drugs, to the end user, during a pandemic.
5. Antivirals should only be used in a community when the pandemic influenza virus is detected in the community. The trigger for starting the use of antivirals in the community will be decided at the local level in conjunction with the province/territory and will be dependent on availability.
6. During a pandemic, the amount of amantadine required by persons with Parkinson's disease should be reserved for this indication.

7. During a pandemic, the antivirals strategy should utilize all anti-influenza drugs available to Canadians. Either M2 ion channel inhibitors (e.g., amantadine) or neuraminidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.
8. The following priority groups for the use of anti-influenza drugs in times of short supply should be used for planning purposes during the inter-pandemic period.

The following groups, in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.

1. Treatment of persons hospitalized for influenza
2. Treatment of ill health care and emergency services workers
3. Treatment of ill high-risk persons* in the community
4. Prophylaxis of health care workers
5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
6. Prophylaxis of essential service workers
7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
8. Prophylaxis of high-risk persons* in the community

**Note: during a pandemic the definition of high-risk persons may change based on epidemiologic evidence.*

The mass prophylaxis of children to control a pandemic is currently not recommended.

9. The susceptibility of circulating influenza strains to available antivirals should be monitored.
10. Given the rapidly changing scientific evidence, recommendations and options for treatment and prophylaxis with antivirals should be regularly reviewed.

Rationales for Specific Recommendations

Rationale for addressing supply issues (recommendation #3)

Vaccination with an effective vaccine is the primary public health intervention during a pandemic. However, vaccine production requires the acquisition of the seed virus and therefore cannot be initiated until the pandemic virus is already infecting humans. Once a suitable vaccine seed strain is available to manufacturers, it is anticipated that vaccine production will require at least 3 to 4 months and even then the availability of doses will be staggered and limited. Furthermore each individual may need to receive two doses of vaccine to be protected.

At this time antiviral drugs are the only specific medical intervention targeting influenza that will potentially be available during the initial pandemic response. Antiviral drugs can be used to prevent influenza and, unlike vaccines, can also be used to treat cases that are identified early in their illness. The strategic use of these drugs in identified priority groups, therefore, will be critical to achieving the goal of minimizing serious illness and overall deaths, and secondly minimizing societal disruption among Canadians as a result of an influenza pandemic.

Current supplies of antivirals in Canada (and outside of Canada) are very limited and surge capacity is negligible. In 1997 when a strain of influenza that was believed to have pandemic potential was identified in Hong Kong, antiviral drugs rapidly became virtually unavailable for purchase world-wide.

Rationale for governmental control of anti-influenza drugs during a pandemic (recommendation #4)

During a pandemic, governmental control of anti-influenza drugs will be essential to ensure equitable distribution and appropriate use of these drugs in limited supply. Without strict control over the use of these drugs, it is possible that amantadine will be used for treatment purposes, further increasing the risk of drug resistance. In addition, governmental control may reduce wastage including the use of these drugs on cases presenting more than 48 hours after onset of illness.

Rationale for the roles of amantadine and neuraminidase inhibitors (recommendation #7)

Neuraminidase inhibitors are preferred for the treatment of pandemic influenza since the emergence of drug resistance during treatment is less likely to occur as opposed to amantadine where emergence of resistance occurs rapidly. In addition, neuraminidase inhibitors are associated with fewer side effects than amantadine. Neuraminidase inhibitors have been shown to be effective at preventing influenza and oseltamivir is now licensed for prophylaxis. These drugs will likely be better tolerated than amantadine, facilitating compliance, and will need to be available for this purpose should the circulating virus become resistant to amantadine.

Rationale for priority groups (recommendation #8)

Priority groups have to be in keeping with the overall goal of reducing morbidity, mortality and secondly to reduce societal disruption. Since it will not be possible to determine a "risk level" for individuals until the pandemic virus has started causing illness in a population, these groups were identified based on past experience with severe influenza seasons and historic accounts of past pandemics. It is important to recognize that during a pandemic the definition of "high-risk persons" will be based on the epidemiologic data available at that time.

What is known is that in order to ensure an optimal pandemic response it will be imperative to provide as much protection as possible against influenza to health care workers and other essential emergency service workers. Since onset of the pandemic in Canada is expected to precede the availability of an effective vaccine, antiviral drugs represent one method of preventing infection until these workers can achieve protection through immunization. Typically immunity is assumed to have been conferred 2 weeks after influenza immunization; however, this may differ for the pandemic vaccine and it may be necessary to give two doses of vaccine to each individual before immunity is assured.

- ***Priority group 1***: To be consistent with the goal of reducing morbidity and mortality and considering the optimal use of these drugs in relation to onset of illness, those who are hospitalized within the first 48 hours of onset of illness should be highest priority for treatment.

- ***Priority group 2***: Considering the essential role that health care providers and emergency service workers will have in the pandemic response, influenza cases in these groups that are identified within the first 48 hours of onset of illness should be high priority for treatment.
- ***Priority group 3***: Persons with underlying heart and lung conditions or those who are immunocompromised, who present to ambulatory settings within 48 hours of onset of symptoms (before they get sick enough to be hospitalized) will also be considered high priority for treatment since they are at high risk for complications.
- ***Priority group 4***: Until an effective vaccine becomes available or during the interval between administration of an effective vaccine (or vaccine series) and induction of immunity, antivirals should be provided for HCWs, including public health staff, since their continuing functions are essential to the pandemic response plan and to the care of patients with other conditions.
- ***Priority group 5***: Reducing the impact of influenza outbreaks in institutions where the most vulnerable persons reside will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.
- ***Priority group 6***: Emergency service workers (ESWs) will be important for maintaining the pandemic response, key community services and national defence. Prophylaxis of this group will minimise societal disruption. Each P/T should consider the list below as the "main" list and make additions as necessary based on their own unique needs and priorities for ESWs.
    - police, fire, correctional services
    - armed forces
    - key emergency response decision makers (e.g., elected officials, essential government workers and disaster services personnel)
    - funeral services
    - utilities (water, gas, electricity)
    - telecommunications
    - public transport and transportation of essential goods (e.g., food)
- ***Priority group 7***: High-risk persons hospitalized for conditions other than influenza related complications will be at risk for acquiring influenza while in hospital, given the large numbers of patients and hospital staff who may be infected during a pandemic. Influenza may result in influenza-related complications in such patients, an increase in severity of their underlying illness, prolonged hospital stay and death. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.
- ***Priority group 8***: Prophylaxis of high-risk persons who have not received influenza vaccine or for whom the effectiveness of the vaccine may be reduced is a current recommendation of NACI. This group is likely to experience severe illness during a pandemic and prophylaxis with anti-influenza drugs should be considered if an effective vaccine is not available. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.

Outstanding Issues

The Antivirals working group has identified several outstanding issues. Some of these issues will be addressed through consultation with the other pandemic working groups, while others require research and consultation with the drug manufacturers.

There are several antiviral supply issues including:

- security of supply;
- bulk purchasing;
- control of inventory;
- possibility of domestic production (explore possibility for manufacturing of amantadine raw products in Canada);
- sequestering available supply for public health use and Parkinson's disease patients (need to know the amount of drug used by Parkinson's disease patients);
- buying more drugs at time of pandemic (likely availability and should this be pursued if drugs available)

These supply issues will be further examined by a sub-committee of the Antivirals working group.

All antivirals guidelines should be validated during the pre-pandemic period. The recommendations regarding the use of antivirals in short supply for targeted groups requires further consultation including ethics and public opinion. More specific definition of high-risk groups is also necessary.

Further data on neuraminidase inhibitors efficacy as prophylactic agents and evidence that they have a greater efficacy than amantadine for prophylaxis are required. As well, the reduction in cost of these drugs before they can be considered for prophylaxis.

While there has been no experience with the use of any of the antiviral drugs for pandemic influenza control, research during the inter-pandemic period is providing reasonable robust evidence upon which the pandemic antiviral drug strategy can be developed.

Communication with health care professionals and the public on the appropriate use of antivirals is needed during the pre-pandemic and pandemic periods. Clinical guidelines on the use of antivirals in the hospital and the community will be developed as part of the clinical care guidelines. Guidelines for delivery/administration of antivirals, the monitoring of drug distribution, uptake, and wastage, including antiviral security still needs to be addressed.

Communication materials for health care providers and the public on the appropriate use of antiviral drugs should be developed and circulated during the pre-pandemic period

Research during the pre-pandemic period and protocols for studies at the time of a pandemic are required to further evaluate the outcomes of specific antiviral prophylaxis and treatment strategies.

Research issues include:

- The outcomes of specific interventions and the value of antiviral prophylaxis versus treatment.
- The benefit of antivirals in reducing complications of influenza and death, especially in high-risk persons and in those with severe influenza illness (e.g., severe viral pneumonitis).

- The efficacy and safety of antivirals for the treatment and prophylaxis of children and select high-risk groups such as infants, pregnant women, immunocompromised persons, elderly with underlying disease.
- The minimum effective dose and duration for prophylaxis or treatment of complicated and uncomplicated influenza.
- The use of combination therapy in different populations.
- The mechanism for resistance to both classes of antivirals and assessment of the biological consequences (infectiousness, virulence) of resistance.
- The use of laboratory testing including rapid diagnostics to assist in decision making for use of antivirals.
- The effect of antiviral administration on the response to live attenuated influenza vaccines.
- The shelf life of antivirals and raw materials, beyond those estimated by manufacturer.

F Infection Control and Occupational Health Guidelines During Pandemic Influenza In Traditional and Non-Traditional Health Care Settings

Executive Summary

The *Infection Control and Occupational Health Guidelines During Pandemic Influenza in Traditional and Non-Traditional Health Care Settings* have been prepared by Health Canada's Nosocomial and Occupational Infections Section from the Centre for Infectious Disease Prevention and Control. These guidelines are one of the annexes of the Canadian Pandemic Influenza Plan.

These guidelines are designed to assist those responsible for managing pandemic influenza in traditional and non-traditional health care settings. Traditional health care settings include acute, long term, ambulatory and community care. Non-traditional health care settings are those settings that are designated for operation prior to an influenza pandemic and become operational only when an influenza pandemic is declared by the World Health Organization (WHO). Non-traditional settings include triage settings, self care settings and temporary influenza hospitals. Organizations that assume responsibility for non-traditional settings are referred to as "parent organizations" in this document. If there is no "parent" organization to plan or operate the non-traditional setting, it is expected another organization would assume this role. Public Health may be in the best position to plan or operate such facilities, although this would need to be negotiated and corroborated.

This document presents an overview of infection prevention and control policies and procedures that will be critical to minimize the transmission of pandemic influenza, with or without the availability of immunization or chemoprophylaxis, and for preventing other infectious diseases. Therefore, the *Infection Control and Occupational Health Guidelines During Pandemic Influenza in Traditional and Non - Traditional Health Care Settings* are based on previously published Health Canada infection control guidelines. It is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources become scarce.

Part A describes a foundation to develop an infection control/occupational health (IC/OH) plan for the management of pandemic influenza with particular focus on influenza transmission, routine practices, pandemic influenza education and public health restrictions. Major attention is given to the management of health care workers during an influenza pandemic. Recommendations for the use of influenza vaccine and antivirals for health care workers (HCWs) and patients are not included in these guidelines because they are fully outlined in the vaccine and antiviral annexes (Annexes D and E) of the Canadian Pandemic Influenza Plan.

Part A also explains the lack of evidence to support the use of masks to prevent transmission of influenza during previous pandemics. The evidence shows that, in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or helpful when transmission has entered the community. Masks may be worn by HCWs to prevent transmission of other organisms from patients with an undiagnosed cough. For the purpose of this document, the term mask refers to surgical masks, not to special masks such as high efficiency dust/mist masks or respirators.

Hand Hygiene is emphasized throughout the guidelines because strict adherence to handwashing/hand antisepsis recommendations is the cornerstone of infection prevention. Proper hand hygiene may be the only preventative measure available during a pandemic.

Part B describes the Management of Pandemic Influenza in traditional settings. Acute care, long term care, ambulatory care and individual community settings are stand-alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. References to published guidelines are frequent because it is expected that personnel in traditional health care settings are well acquainted with the series of infection control guidelines published by Health Canada.

Part C outlines the Management of Pandemic Influenza in non-traditional settings. Triage, self care setting and temporary influenza hospitals are stand alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. Detailed recommendations, adapted from published infection control guidelines, are provided for non-traditional settings as the planning and operation of such settings will be a novel situation.

Appendix I. The "Guideline Rating System" describes the system of ranking the strength of the evidence used to support the recommendations made in these guidelines.

Appendix II. The "World Health Organization Pandemic Influenza Phases" is the outline of the staged plan for responding to a pandemic threat and is based on the WHO influenza surveillance program.

Appendix III. The "Hand Hygiene Procedures", A. How to Wash Hands and B. Decontaminating Hands with an Alcohol-based Hand Rub provide specific details related to hand hygiene.

Appendix IV. An "Influenza-Like-Illness (ILI) Assessment Tool" is provided to assist with immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management. This ILI triage tool should not be used for clinical management. Clinical management is specified in the "Clinical Care Guideline and Tools" annex of the Canadian Pandemic Influenza Plan.

Appendix V. Table A, "Cleaning Procedures for Common Items" provides examples of how common items are cleaned. Table B, "Directions for Preparing and Using Chlorine Bleach" describes recommendations for dilutions of specific products and their intended use.

These guidelines **do not** discuss **interpandemic** influenza. Infection control and occupational health recommendations for interpandemic influenza are addressed in other Health Canada guidelines, specifically in the *Infection Control Guidelines for the Prevention of Health Care-Associated Pneumonia.*, currently being developed.

Glossary of Terms

Antiseptic hand rub	A waterless, antiseptic hand rub product that is applied to all surfaces of the hands to reduce the number of microorganisms present[1].
Biomedical waste	Defined by the Canadian Standards Association[2] as waste that is generated by human or animal health care facilities, medical or veterinary settings, health care teaching establishments, laboratories, and facilities involved in the production of vaccines[3].
Cleaning	The physical removal of foreign material, e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms. Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action. In certain settings, (e.g., central service or dietetics), the terms decontamination and sanitation may be used for this process. Cleaning reduces or eliminates the reservoirs of potential pathogenic organisms. Cleaning agents are the most common chemicals used in housekeeping activity[3].
Cohort	Two or more patients exposed to, or infected with, the same organism who are separated physically (e.g., in a separate room or ward) from other patients who have not been exposed to, or infected with, that organism[4].
Cohort staffing	The practice of assigning specific personnel to care only for patients/residents known be exposed to, or infected with, the same organism. Such personnel would not participate in the care of patients/residents who have not been exposed to, or infected with, that organism[4].
Contact transmission	Includes direct contact, indirect contact and droplet transmission as described below[5]: › **Direct contact** occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host (body surface to body surface). › **Indirect contact** involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients, contaminated instruments or other inanimate objects in the patient's immediate environment.
Critical items	Instruments and devices that enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganism, including bacterial spores. Reprocessing critical items, such as surgical equipment or intravascular devices, involves meticulous cleaning followed by sterilization[3].
Droplet	Refers to large droplets, greater than or equal to 5 m in diameter, generated from the respiratory tract of the source patient during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a short distance, less than 1 meter, through the air and deposited on the nasal or oral mucosa of the new host.

Decontaminate hands	The reduction of bacterial counts on hands is accomplished by performing an antiseptic hand rub or antiseptic hand wash[1].
Decontamination	The removal of disease-producing microorganisms to leave an item safe for further handling[3].
Disinfection	The inactivation of disease-producing microorganisms. Disinfectants are used on inanimate objects; antiseptics are used on living tissue. Disinfection does not destroy bacterial spores. Disinfection usually involves chemicals, heat or ultraviolet light. Levels of chemical disinfection vary with the type of product used[3].
Exposure	The condition of being subjected to a microorganism or an infectious disease in a manner that enables transmission to occur[6].
Fit for Work	Terminology used in occupational health to communicate a worker's ability to remain at or return to work. This ability includes three categories: fit for work, unfit for work, fit with restrictions. This categorization allows the occupational health nurse to maintain confidentiality about a worker's diagnosis, symptoms, immune status, etc.[6] › **Fit for Work** - Fit to work with no restrictions › **Unfit for Work** – Defined as a restriction from patient care tasks, co-worker contact and restriction from the workplace. › **Fit for work with restrictions** - Allows for the re-assignment of duties or re-integration into the workplace in a manner that will not pose an infection risk to the HCW or to the patients and or other individuals in the workplace.
Hand antisepsis	This term refers to either antiseptic handwash or antiseptic handrub[1]. A process for the removal or reduction of resident and transient microorganisms[3].
Hand hygiene	A general term that applies either to handwashing, an antiseptic handwash, an antiseptic hand rub, or a surgical hand antisepsis[1].
Handwashing	Washing hands with plain (i.e., non-antimicrobial) soap and water[1]. A process for the removal of soil and transient microorganisms from the hands[3].
Health Care Worker (HCW)	HCWs are professionals, including trainees, and retirees, nonprofessionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services. For the purposes of this definition, HCWs are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work.
High level disinfection	This term refers to the level of disinfection required when processing semicritical items. High level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores. High level disinfectant chemicals (also called chemisterilants) must be capable of sterilization when contact time is extended. Items must be thoroughly cleaned prior to high level disinfection[3].

Infectious waste	The portion of biomedical waste that is capable of producing infectious disease.
Influenza	**Clinical Case Definition of Influenza** When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38°C and when the time of onset of the clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache, although unspecific, may also be present[1]. **Confirmed Case of Influenza** Confirmed cases of influenza are those with laboratory confirmation (i.e., virus isolation from respiratory tract secretions, identification of viral antigens or nucleic acid in the respiratory tract, or a significant rise in serum antibodies) or clinical cases with an epidemiological link to a laboratory-confirmed case[7]. **Influenza-Like-Illness (ILI)** For surveillance purposes, the ILI definition currently used in Canada says: › Acute onset of respiratory illness with fever (>38 C) and cough and with one or more of the following: sore throat, arthralgia, myalgia or postration, which could be due to influenza virus as used by the National Influenza Surveillance Program (FluWatch) for the 2002-2003 season[8].
Intermediate level disinfection	The level of disinfection required for some semicritical items. Intermediate level disinfectants kill vegetative bacteria, most viruses and most fungi but not resistant bacterial spores[3].
Low level disinfection	The level of disinfection required when processing noncritical items or some environmental surfaces. Low level disinfectants kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses (e.g., hepatitis B, C, Hantavirus, and HIV). Low level disinfectants do not kill mycobacteria or bacterial spores. Low level disinfectants-detergents are used to clean environmental surfaces[3].
Mask	A barrier covering the nose and mouth to protect the mucous membranes from microorganisms contained in large droplet particles (> 5 m in size) generated from a source person during coughing, sneezing, or talking and during the performance of certain procedures that generate droplets (e.g., suctioning) or are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Masks may also be used to contain large droplet particles generated by coughing or sneezing persons. The term mask in this document refers to surgical masks, not to special masks, such as high efficiency dust/mist masks or respirators.
Noncritical items	Items that either touch only intact skin but not mucous membranes or do not directly touch the patient/resident/client. Reprocessing of noncritical items involves cleaning and or low level disinfection[3].

Non traditional health care settings	Non-traditional health care settings are those settings that are predetermined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO).
Plain soap	Products that do not contain antimicrobial agents, or contain very low concentrations of antimicrobial agents that are effective solely as preservatives[1].
Parent organization	The organization responsible for the planning of a non-traditional setting operational only in the event of the declaration of an influenza pandemic. When there is no specific organization, another organization must be identified to assume the role of the parent organization.
Personal protective equipment	Attire used by the worker to protect against airborne or droplet exposure and exposure to blood and bloody body fluids, i.e., masks, eye goggles, face shields, gloves and gowns[5].
Precautions	Interventions implemented to reduce the risk of transmission of microorganisms from patient to patient, patient to health care worker, and health care worker to patient[5].
Semicritical items	Devices that come in contact with nonintact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semicritical items involves meticulous cleaning followed preferably by high-level disinfection[3].
Sterilization	The destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Items must be cleaned thoroughly before effective sterilization can take place[3].
Traditional health care settings	Traditional settings include acute, long term, ambulatory and community care.

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I Background Information

The following document provides infection prevention and control guidance for the management of **pandemic influenza** in traditional and non-traditional health care settings. Non-traditional health care settings are those that are pre determined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO).

Infection prevention and control guidelines for **interpandemic influenza** in traditional health care settings, (i.e., acute care, long-term care, ambulatory care and community care), will be addressed in other Health Canada infection control guidelines, specifically the Guideline for the Prevention of Health Care-Associated Pneumonia.

Infection prevention and control guidelines for the management of pandemic influenza in traditional and non-traditional health care settings are based on previously published Health Canada Infection Control Guidelines[3,5,6,9]. Although recommendations to prevent the transmission of infection during the delivery of health care, including during a pandemic are important, it is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable when the pandemic spreads and resources become scarce. For the purpose of this document the term mask refers to surgical masks, not to procedure masks, special masks or respirators.

Throughout this document, the term "parent organization" refers to the organization that assumes responsibility for non - traditional settings. Where there is no "parent" organization to plan or operate the non - traditional settings, it is expected that another organization would assume this role. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

In this document, individuals who have recovered from or have been vaccinated against the pandemic strain of influenza are considered immune with one important caveat regarding the immune status of the vaccinated individual. Because influenza vaccines are not 100% efficacious, if vaccinated individuals come in contact with influenza patients, the vaccinated individual should be monitored for ILI using the ILI Assessment Tool found in Appendix IV. Health Canada will coordinate studies on vaccine effectiveness (see the vaccine annex Annex D in the Canadian Pandemic Influenza Plan for further details).

During a pandemic, it may be necessary to recruit trainees and volunteers to take on specific responsibilities, for example, basic patient care, that is usually reserved for health care workers. The implication is that these workers will need to be considered, for infection control purposes, as being equivalent to health care workers (see glossary) in terms of risk of exposure and ability to transmit disease.

1.1 World Health Organization Phases for Pandemic Influenza

The World Health Organization has developed a staged plan, based on its surveillance program, for responding to a pandemic threat. Recognition of a novel influenza strain in humans triggers a series of responses, identified as phases and levels within phases that can ultimately lead to the declaration of a pandemic. Interpandemic activities are designated as Phase 0. Isolation of a novel virus subtype from a single human case, without evidence of spread, will result in WHO declaring pandemic influenza Phase 0: Preparedness Level 1. Phase 1 is the confirmation of a pandemic, Phase 3 is the end of the first pandemic wave and Phase 4 is the second or subsequent waves of the pandemic[10].

More than one wave of infection can occur in a pandemic[11] possibly due to seasonal influences and the existence of a large pool of susceptible individuals in the population[12].

Key stages of the WHO response are outlined in Appendix II.

2 Principles of Influenza Transmission

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Modes or routes of transmission of infectious agents have been classified as contact, droplet, airborne, common vehicle and vectorborne. Routes pertinent to influenza are contact, droplet and airborne.

2.1 Contact Transmission

Includes direct contact, indirect contact and droplet (large droplet transmission). Routine practices should prevent most transmissions by the contact route. Although droplet transmission is a type of contact transmission, it is considered separately as it requires additional precautions.

- **Direct Contact Transmission** occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host.
- **Indirect Contact** involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients or contaminated instruments or other inanimate objects in the patient's immediate environment.

2.2 Droplet Transmission

Refers to large droplets, greater than or equal to 5 m in diameter, generated from the respiratory tract of the source (infected individual) during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a distance of less than one meter through the air and are deposited on the nasal or oral mucosa of the new host (newly infected individual) or in the immediate environment. These large droplets do not remain suspended in the air, therefore, special ventilation is not required since true aerosolization (see below) does not occur.

2.3 Airborne Transmission

Refers to the dissemination of microorganisms by aerosolization. Organisms are contained in droplet nuclei, airborne particles less than 5 m that result from the evaporation of large droplets, or in dust particles containing skin squames and other debris that remain suspended in the air for long periods of time[13]. Such microorganisms are widely dispersed by air currents and inhaled by susceptible hosts who may be some distance away from the source patients or individuals, even in different rooms or hospital wards. Control of airborne transmission is the most difficult as it requires control of air flow through special ventilation systems.

2.4 Evidence for the Mode of Influenza Transmission

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Organisms, especially respiratory viruses expelled in large droplets, remain viable in droplets that settle on objects in the immediate environment of the patient. Both influenza A and B viruses have been shown to survive on hard, non-porous surfaces for 24-48 hours, on cloth paper and tissue for 8-12 hours and on hands for 5 minutes[14]. The virus survives better at the low relative humidity encountered during winter in temperate zones.

Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. In a report of an outbreak in a nursing home, the pattern of spread was suggestive of contact rather than airborne transmission because patients who were tube fed or required frequent suctioning had higher infection rates than those who did not require such care[15].

Whether or not influenza is naturally transmitted by the airborne route is controversial[16,17]. An outbreak of influenza on an airliner has been attributed to airborne spread; however, large droplet spread could have been responsible because the passengers were crowded together and moved about for several hours in a small, grounded airplane[18]. Although experimental airborne transmission of influenza A virus to mice has been reported, there is no evidence of such transmission in humans[19].

2.4.1 Mode of Influenza Transmission

Influenza is directly transmitted primarily by droplet contact of the oral, nasal, or possibly conjunctival mucous membranes with the oropharyngeal secretions of an infected individual. Influenza is indirectly transmitted from hands and objects freshly soiled with discharges of the nose and throat of an acutely ill and coughing individual[6].

2.5 Routine Practices and Additional Precautions to Prevent the Transmission of Influenza

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Routine practices outline the importance of handwashing before and after caring for patients; the need to use gloves, masks/eye protection/face shields, and gowns when splashes or sprays of blood, body fluids, secretions or excretions are possible; the cleaning of patient-care equipment, the patient's physical environment and soiled linen; the precautions to reduce the possibility of HCW exposure to bloodborne pathogens and patient placement. Routine practices are the infection prevention and control practices for use in the routine care of all patients at all times in all health care settings.

Additional precautions are required when routine practices are not sufficient to prevent transmission. In interpandemic years, the Health Canada guidelines recommend that in addition to routine practices, which should be taken for the care of all patients, additional precautions (droplet and contact precautions) should be taken for pediatric[5] and adult patients with influenza (personal communication, Consensus Meeting for infection control measures with patients presenting with acute, respiratory illness, Gatineau, Quebec, November 24, 2003). This recommendation represents a change because, in the past, it was unclear as to whether or not additional precautions were indicated for adults with influenza.

Children and adults who have the physical and cognitive abilities, should be encouraged to practice good hygiene: i.e., use disposable, one-use tissues for wiping noses; cover nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and, keep hands away from the mucous membranes of the eyes and nose. Therefore, preventing the transmission of influenza is best achieved through strict compliance with routine practices, (i.e., good hygiene) and the use of additional precautions[5].

Routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic are important. Certain routine practice and additional precaution recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce. Because the complexity of managing high risk patients will be greatest in acute care hospitals, it seems reasonable that the highest priority for infection control resources should be given to the acute care settings.

Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventive measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.

2.6 Use of Masks During a Pandemic

Although there is a lack of evidence that the use of masks prevented transmission of influenza during previous pandemics; in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or helpful when pandemic influenza has entered the community. There is no evidence that the use of masks in general public settings will be protective when the virus is circulating widely in the community.

Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough. For the purpose of this document the term mask refers to surgical masks, not to special masks or respirators. Special masks, i.e., high-efficiency dust/mist masks are required for patients with infectious tuberculosis and for non-immune HCWs entering the room of a patient with measles or disseminated varicella.

When using surgical masks[5]:

- They should be used only once and changed if wet (because masks become ineffective when wet).
- They should cover both the nose and the mouth.

- Avoid touching it while it is being worn
- Discard them into an appropriate receptacle.
- They must not be allowed to dangle around the neck.

2.7 Infectivity of the Influenza Virus

The **incubation period** for influenza is from 1-3 days. The **period of communicability** (duration of viral shedding) continues for up to 7 days after the onset of illness[5], probably from 3-5 days from clinical onset in adults and up to 7 days in children[20].

Individuals infected with influenza tend to shed more virus in their respiratory secretions in the early stages of the illness[21,22] and patients are most infectious during the 24 hours before the onset of symptoms and during the most symptomatic period[23]. Viral shedding may be longer in infants[5], and prolonged in young children and immunodeficient patients[20]. It has not been well established whether elderly long term care residents shed viruses longer than other adult populations[24].

There is no information to determine if the period of communicability will be different with pandemic influenza. The duration of shedding of a novel virus (pandemic strain) is unknown. It is possible that prolonged shedding could occur with pandemic influenza because the immune system would not have had prior experience with related strains[25].

Hands can be contaminated with influenza virus by contact with inanimate surfaces or objects in the immediate environment of a patient with influenza infection. Influenza A and B viruses have been shown to survive for 24-48 hours on hard, nonporous surfaces; for up to 8 to 12 hours on cloth, paper and tissues; and on hands for up to 5 minutes after transfer from environmental surfaces[14].

"The influenza virus is readily inactivated by hospital germicides, household cleaning products, soap, hand wash or hand hygiene products." Therefore, neither antiseptic hand wash products in health care settings nor antibacterial hand wash products in home setting are required because routine products, along with proper hand washing procedures, will inactivate the influenza virus.

Infectivity of the Influenza Virus

1. Incubation period:	1-3 days.
2. Period of communicability:	Infectious 1 day before onset of symptoms and may be longer than 7 days after the onset of symptoms.

3 Occupational Health and Infection Control Management of Pandemic Influenza in Traditional and Non-traditional Health Care Settings

3.1 Occupational Health and Infection Control Pandemic Influenza Planning

A broad consensus has emerged regarding plans for pandemic influenza: the plans should be aimed at reducing influenza-related morbidity, mortality and social disruption. It is widely recognized that preparation for the next pandemic requires that an infrastructure be in place during the interpandemic period for the following reasons:

(a) the rapid detection of novel variants and disease caused by them,

(b) the production and delivery of influenza vaccines and antiviral agents to high priority target groups,

(c) the rapid dissemination and exchange of information; and

(d) emergency preparedness.

Pandemic plans should outline the responsibilities of the institutions that will be involved in the pandemic response. The plan should be divided into phases that describe, in detail, a step-wise response to the identification and subsequent spread of a novel virus, as well as the ability to cut back the response if a novel virus fails to spread as occurred in 1976 and 1977[10].

Planning for and the management of pandemic influenza is directly related to the strength of the strategy in place for the management of interpandemic influenza; a strong interpandemic plan will affect the outcome of the pandemic plan[12].

"The trends of modern society, including the increasing availability of rapid human transportation and the urbanization of the rapidly expanding human population, tend to facilitate the spread of influenza and increase morbidity. Modern medicine can reduce the mortality that resulted from complications of infection with influenza virus during earlier epidemics, but the cost of medical interventions has increased to the point that effective methods of epidemic control should be considered. **This challenge provides an opportunity to develop, test, and have in place a strategy for control of interpandemic influenza before the next pandemic"**[12].

During an influenza pandemic, adherence to infection prevention and control policies and procedures is critical to minimize the transmission of influenza and other infectious diseases. It is anticipated that neither influenza immunization nor chemoprophylaxis will be available in the early stages of a pandemic and perhaps not even available in later stages, necessitating an emphasis on infection prevention and control practices.

3.1.1 Recommendations

1. All organizations responsible for traditional health care settings (i.e., acute, long term, ambulatory, home and community care) and organizations (i.e., parent organizations) responsible for the planning of non-traditional settings (i.e., triage settings, self care settings and temporary influenza hospitals) operational only during an influenza pandemic, should develop an Infection Control and Occupational Health (IC/OH) plan for the management of pandemic influenza. The plan should be developed according to previously published Health Canada Infection Control Guidelines[3,5,6,9] and federal/provincial/territorial/municipal/regional contingency plans with a multi-disciplinary group that includes, but is not limited to:

   (a) representatives from traditional and non traditional organizations including:

      - medical administration
      - nursing administration
      - physicians
      - nursing services
      - physical plant and housekeeping
      - occupational health
      - infection prevention and control
      - pharmacy services
      - emergency services
      - respiratory services
      - public affairs
      - educational services
      - laboratory services;

   (b) public health personnel;

   (c) community care providers;

   (d) local pandemic planners;

   (e) funeral service workers;

   (f) local disaster planners.

   AIII

2. Non traditional settings that are not associated with a "parent" organization must develop their IC/OH plan for the management of pandemic influenza with an organization that would assume this role of "parent" organization. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

   AIII

3. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should be reviewed every 3 years and updated according to current legislation and relevant publications.

   AIII

4. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should include the preparation of educational information for

health care workers (see glossary for HCW definition, see section 4.1 for HCW education and see section 3.5 for management of HCWs during a pandemic).

AIII

5. The IC/OH plan for the management of pandemic influenza should include recommendations for the use of influenza vaccine and chemoprophylaxis for health care workers according to the vaccine (Annex D) of the Canadian Pandemic Influenza Plan.

   AIII

6. Pandemic influenza planning should include support for programs to meet Canadian target coverage rates for pneumococcal immunization[26-28].

   AIII

7. **Strict adherence to hand washing/hand antisepsis recommendations (see Appendix III) is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

   Planning should include ensuring that adequate supplies of hand hygiene products are a priority for all health care settings as there may be an interruption to the supply or shortages of hand antisepsis products, soap and hand towels

   AII

8. Planning should include the priority of maintaining adequate resources for infection control in acute care hospitals (soap, antiseptic products, masks/eye protection/face shields, gloves, gowns) due to the increased complexity and management issues of hospitalized patients.

   AII

9. Planning should include ensuring all HCWs (see glossary for HCW definition) are offered hepatitis B immunization[6,9]. As resources permit, HCWs should also receive TB skin testing, should have proof of measles, mumps, rubella (MMR) immunity and receive a tetanus booster if appropriate[6].

   AII

3.2 Definitions for Infection Control/Occupational Health Management of Patients/Staff with Influenza-Like Illness (ILI)

3.2.1 Influenza-Like-Illness

See glossary term "influenza".

Refer to Appendix IV for an ILI Assessment Tool. An ILI Assessment Tool is to be used for immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management.

3.2.2 Clinical Case Definition

See glossary term "influenza".

3.2.3 Confirmed Case of Influenza

See glossary term "influenza".

3.2.4 Immunity to Influenza

During a pandemic, it is likely that most cases of influenza will be caused by the pandemic strain. Data from the 1957 and 1968 pandemics show that the previously circulating influenza strain disappeared from human circulation when the pandemic strain of influenza virus emerged[25]. Therefore, HCWs who have recovered from an ILI during an earlier pandemic phase, may be assumed to be immune to the pandemic influenza strain.

Individuals who have been immunized against the pandemic strain of influenza will also be considered immune, recognizing that the influenza vaccine may not be fully protective. Therefore, unlike individuals who have recovered from pandemic influenza or ILI, vaccinated individuals should be monitored for ILI using the ILI Assessment Tool found in Appendix IV.

3.3 Use of Influenza Immunization During an Influenza Pandemic

See the vaccine annex (Annex D) of the Canadian Pandemic Influenza Plan. Influenza vaccine availability in the early phase(s) of the pandemic is uncertain. When available, vaccine will be provided according to priority groups set by recommendations from the Vaccine Working Group. Health Care Workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

3.4 Use of Antivirals During an Influenza Pandemic

See the antivirals annex (Annex E) of the Canadian Pandemic Influenza Plan. Antiviral availability in the early phase(s) of the pandemic is uncertain. When available, antivirals will be provided according to priority groups set by recommendations from the Antiviral Working Group. Health care workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

3.5 Occupational Health Management of Health Care Workers During an Influenza Pandemic

The phrases "fit for work", "unfit for work", and "fit to work with restrictions" are used by Occupational Health to communicate a worker's ability to remain at or return to work depending upon their susceptibility to influenza, immunization status and agreement to use antivirals[6]. During the early phases of a pandemic, vaccine and antiviral availability will be limited and will be provided to priority groups. Health Care Workers, and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW, are to be one of the priority groups. (See Annexes D and E of the Canadian Pandemic Influenza Plan.)

3.5.1 Recommendations

1. *Fit for Work*

(a) Ideally, HCWs are fit to work when one of the following conditions apply:

   (i) they have recovered from ILI (see glossary for definition and ILI Assessment Tool, Appendix IV) illness during earlier phases of the pandemic;

(ii) they have been immunized against the pandemic strain of influenza as outlined in Annex D of the Canadian Pandemic Influenza Plan; or,

(iii) they are on appropriate antivirals as outlined in Annex E of the Canadian Pandemic Influenza Plan.

Such HCWs may work with all patients and may be selected to work in units where there are patients who, if infected with influenza, would be at high risk for complications.

AIII

(b) Whenever possible, well, unexposed HCWs should work in non-influenza areas.

AIII

(c) Asymptomatic HCWs may work even if influenza vaccine and antivirals are unavailable. Meticulous attention should be paid to hand hygiene and HCWs should avoid touching mucous membranes of the eye and mouth to prevent exposure to the influenza virus and other infective organisms.

AIII

2. *Unfit for Work*

Ideally, staff with ILI should be considered "unfit for work" and should not work; nonetheless, due to limited resources, these HCWs may be asked to work if they are well enough to do so (see 3(b) below).

AIII

3. *Fit to Work with Restrictions*

(a) Ideally, symptomatic staff who are considered "fit to work with restrictions" should only work with patients with ILI. Health Care Workers who must work with non-exposed patients (non-influenza areas) should be required to wear a mask if they are coughing and must pay meticulous attention to hand hygiene.

AIII

(b) Symptomatic HCWs who are well enough to work should not be redeployed to intensive care areas, nurseries[29-31] or units with severely immunocompromised patients, i.e., transplant recipients[32], hematology/oncology patients[33-35], patients with chronic heart or lung disease, or patients with HIV/AIDS and dialysis patients.

AII

4 Pandemic Influenza Education

4.1 Pandemic Influenza Education for Health Care Workers (Including Emergency Medical Services, mortuary workers, and HCWs in correctional settings)

Recommendations

1. Educational information for workers should be provided as soon as WHO Pandemic Phase 0 Level 1 is declared (see Appendix II) and repeated at frequent intervals to all staff levels and during all shifts.

AIII

2. The pandemic influenza information should be appropriate to the audience and be provided using a variety of methods, e.g., postings in elevators, at facility entrances, brochures, newsletters and web sites.

AIII

3. The educational information prepared and provided for workers should include:
   - (a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;
   - (b) the facility-specific pandemic influenza plan;
   - (c) information regarding triage settings (see Section 7.1), self care (see Section 7.2) and temporary influenza hospitals (see Section 7.3).
   - (d) the difference between an upper respiratory infection and influenza (see the introduction to the Preparedness Section of the Canadian Pandemic Influenza Plan);
   - (e) the mode of influenza transmission (see Section 2.4);
   - (f) the criteria for determining, influenza-like-illness (ILI) (see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see glossary for definition);
   - (g) the risk of infection and subsequent complications in high-risk groups;
   - (h) the message that **strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during early phases of the pandemic** (see Appendix III);
   - (i) information about the importance of hygienic measures (see Section 2.5) to minimize influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;
   - (j) information indicating that, during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the

community (see Section 2.6). Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough;

(k) who will be given the highest priority for immunization when vaccine is available,

(l) the importance of being immunized and safety of immunization (see Annexes D and E of the Canadian Pandemic Influenza Plan);

(m) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annexes D and E of the Canadian Pandemic Influenza Plan).

↑**BIII**

4. Information about the importance of routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic. This information should include the caveat that some routine practice and additional precaution recommendations may be achievable only in the early phases of the pandemic and other recommendations may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce.

↑**BIII**

5. Priority for infection control resources should be assigned to acute care settings because of the complexity of managing high risk patients in acute care settings.

↑**BIII**

6. Education about routine practices for those expected to work in non-traditional settings, as outlined in this document, should be available. Refer to Section 7.1 for Triage Settings, Section 7.2 for Self Care Settings and Section 7.3 for Temporary Influenza Hospitals.

↑**BIII**

7. Education about Routine Practices in traditional health care settings, as outlined in Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999, should be ongoing.

↑**BIII**

8. HCWs should be provided with the recommendations for Occupational Health Management of workers during a pandemic (See Section 3.5).

↑**BIII**

4.2 Pandemic Influenza Education for the Public (including child care workers, teachers, shelter workers, correctional workers, etc.)

Recommendations

1. Provide education appropriate to the recipient, as soon as WHO Pandemic Phase 0 Level 1 is declared (see Appendix II). Include information about the epidemiology and mode of transmission of influenza using a variety of methods, e.g., postings at facility entrances, brochures, newsletters, web sites, television and radio stations.

↑**AIII**

2. Educational information prepared and provided for the public should include:

   (a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;

(b) information regarding Self Care (see Section 7.2 and Annex G of the Canadian Pandemic Influenza Plan) and for the purpose of Triage Settings and Temporary Influenza Hospitals (see Annex G of the Canadian Pandemic Influenza Plan);

(c) the difference between an upper respiratory infection and influenza (see the introduction to the Preparedness Section of the Canadian Pandemic Influenza Plan;

(d) the mode of transmission of influenza (see Section 2.4);

(e) the criteria for determining, influenza-like-illness (ILI) (see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see Glossary for definition);

(f) the risk of infection and subsequent complications in high-risk groups;

(g) the message that **strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during the pandemic;**

(h) information about the importance of hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose to minimize potential influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;

(i) information that the influenza virus is readily inactivated by plain soap and common household cleaning products;

(j) information indicating that during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when coming face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the community. In health care settings, HCWs should wear masks to prevent transmission of other organisms from patients with undiagnosed cough (see Section 2.6);

(k) who will be given the highest priority for immunization when a vaccine is available, importance of being immunized and safety of immunization (See the Preparedness Section of the Canadian Pandemic Influenza Plan);

(l) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annex E of the Canadian Pandemic Influenza Plan).

↑**AIII**

3. Provide information to encourage those who are symptomatic with ILI (see Appendix IV for an ILI Assessment Tool) but do not require formal health care, to remain at home until their symptoms have resolved.

↑**BIII**

4. Provide information to encourage those with ILI (see Appendix IV for an ILI Assessment Tool) to avoid visiting those who are at high risk for complications if they developed influenza in institutional settings (acute care and long term care) until their symptoms have resolved.

↑**BIII**

5. Inform the public to avoid public gatherings, as discussed in the following section, to minimize exposure.

BIII

5 Public Health Restrictions on Public Gatherings

Medical Officers of Health, through their provincial/territorial Public Health Acts, have the authority to quarantine individuals or groups, as deemed necessary, to control infectious diseases. During the 1918 influenza pandemic in Alberta, drastic control measures were taken; masks were required when going out in public; all schools, churches and theatres were closed, public meetings banned and towns were quarantined (Alberta Pandemic Influenza Planning overhead presentation given by Dr. K Grismsrud at the Canadian Pandemic Planning, meeting held in Montreal, May, 2001).

In an historical review of the 1918 pandemic in the United States, Keen-Payne[36] noted that many other centres used similar measures to attempt to curb transmission. In Chicago, persons who sneezed openly or who spit were threatened with arrests and fines. Churches were not closed, but parishioners were requested to stay home if ill, and windows were opened for ventilation during services. By the third week in October 1918, (the peak of the second wave) closing had extended to theaters, banquets, lecture halls, restaurants and movie shows.

In Newark, the state simply banned all public gatherings on October 10. Confusion developed when liquor stores were allowed to remain open for sales but churches were not open for congregating. The churches protested and the ban was lifted on October 21. In San Diego, all public facilities were closed (libraries, pool halls, women's weekly club meeting halls) as were all outdoor meetings except those convened to sell liberty bonds. The ban was lifted and then imposed again as new cases of influenza increased. Citizens were never strongly supportive of these measures[36].

The suggestion that the spread of influenza from US military camps in the summer of 1918 did not occur until school returned in the fall, has been noted[37]. In the United States, illness rates of nearly 40% were reported among schoolchildren during the autumn wave[38].

Following the 1957 epidemic in Japan, the policy on influenza immunization was changed as it was determined that school attendance played an important part in spreading that epidemic. There were wide-spread school closures, with attack rates as high as 60% in some areas and approximately 8,000 deaths. The new policy stated that "because schoolchildren are the major disseminators of the disease, they should be immunized". In a study to review whether the policy of vaccination of school children in Japan (over a 25-year period) reduced the incidence and mortality attributed to influenza among older persons, the authors concluded that the vaccination of schoolchildren in Japan disrupted the spread of influenza to older persons[39].

There is evidence that closing schools may change the course of transmission[12,40,41]. Studies conducted both during pandemic years and interpandemic years demonstrate that age-specific attack rates are highest among school children[12]. Additional studies noted that the age distribution of culture-positive patients changed during the course of epidemics. Initially, school children were culture positive, followed by a shift to preschool children and adults during the latter part of the epidemic[42]. The authors observed that school absenteeism was often followed by employee absenteeism during the influenza epidemics studied.

It is thought that management of exposure, as an approach to the prevention of a pandemic, is not possible because of the current high levels of international travel and the expansion of populations into many regions of the world. Options for slowing the spread of pandemic influenza have been suggested and include the use of antiviral prophylaxis, limiting congregations of people and, possibly, quarantine[43].

In preparation of an influenza pandemic and in an attempt to curtail community transmission, there are neither data nor guidelines to determine which public gatherings to close and when to close them. What constitutes a public gathering and whether some gatherings may be defined as essential versus non-essential needs to be clarified. Examples of public gatherings from the above included: transportation (ground, rail and air), childcare, schools, retail settings, workplaces, places of worship, funerals and community events (cultural/sporting).

The principles to determine when, how, and which public gatherings will be restricted in order to curtail community transmission ought to be based on common sense strategies, and should be consistently applied within, and across, jurisdictions. The severity of the pandemic strain and the stage of the pandemic, as it unfolds globally, should be considered when making this determination. Refer the to Public Health Measures document of the Preparedness Section of the Canadian Pandemic Influenza Plan for more comprehensive public health recommendations than those listed below.

5.1 Recommendations

1. Medical Officers of Health should develop a predetermined strategy for closing public gatherings. If public gatherings are restricted they should be restricted early enough to affect transmission. The strategy should include but is not limited to:
    (a) the definition of what constitutes a public gathering;
    (b) specifying the time period within the pandemic phases to implement the strategy;
    (c) applicability and consistency across jurisdictions;
    (d) availability of and priority use of vaccine and antivirals as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan;
    (e) consideration as to whether or not school age children are to be considered a high priority for immunization or antivirals in the early phase of the pandemic.

BIII

Part B. Management of Pandemic Influenza in Traditional Health Care Setting

I Management of Pandemic Influenza in Acute Care Settings

Acute care settings group patients together who have a high risk of developing serious, sometimes fatal, complications related to influenza. In addition, morbidity and mortality related to hospital-acquired (i.e., nosocomial) infections is much greater in acute care populations than in other populations.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the acute care setting with or without availability of immunization or chemoprophylaxis.

Recommendations

1.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

Adherence to recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is of paramount importance.

1.2 Control of Pandemic Influenza

A. Physical Setting

1. When Pandemic Phase 2 is declared (see Appendix II), open Triage Settings in acute care hospitals as predetermined in the Preparedness Section of the Canadian Pandemic Influenza Plan.

   AIII

2. When Pandemic Phase 2 is declared (see Appendix II) open cohort areas/units[4] in the hospital (See Sections F. and G. below) as predetermined in the IC/OH Pandemic Plan.

   AIII

B. Management of Staff

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

C. *Infection Control Practices*

1. Routine Practices

Using a program to prevent hospital-acquired (i.e., nosocomial) infections, acute care facilities should adhere to published guidelines including Health Canada Infection Control Guidelines. *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

2. Additional Precautions

Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

Routine Practices are summarized below:

(a) Hand Hygiene

Staff, patients and visitors should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

i. Hand hygiene procedures should be reinforced according to Appendix III.

↑**AII**

ii. Hands should be washed or hand antisepsis performed after direct contact with patients/workers with ILI and after contact with their personal articles or their immediate environment.

↑**AII**

(b) Hygiene Measures to Minimize Influenza Transmission

i. Patients, staff and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, e.g., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑**AIII**

(c) Personal Protective Equipment (PPE)

i. Masks

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when influenza transmission has entered the community.

↑**BIII**

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

↑**BIII**

3. Masks and eye protection, or face shields **should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

   ↑**BIII**

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Use masks, as outlined in Section 2.6

ii. Gloves

1. Gloves are not required for the routine care of patients suspected or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

   ↑**AIII**

2. Gloves **should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient-to-patient via HCWs' hands.

   ↑**AII**

3. Gloves **are necessary** for HCWs with open lesions on their hands when providing direct patient care.

   ↑**AII**

4. Gloves **should be** used as an additional measure, not as a substitute for hand hygiene[46,47].

   ↑**BII**

5. Gloves should not be reused or washed[47].

   ↑**AII**

iii. Gowns

1. Gowns are not required for the routine care of patients suspected or confirmed to have influenza.

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2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

   ↑**BIII**

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

   ↑**BIII**

(d) Cleaning, Disinfection, and Sterilization of Patient Care Equipment

i. Acute care settings should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and*

Sterilization in Health Care[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

AIII

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Acute care settings should adhere to the recommendations for housekeeping, laundry and waste management as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

AIII

ii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

BIII

iii. Special handling of linen or waste contaminated with secretions from patients suspected or confirmed to have influenza is not required.

AII

D. *Accommodation*

1. Single rooms in acute care settings[5] are limited and should be for those suspected of having or confirmed to have airborne infections, e.g., tuberculosis, measles, varicella and disseminated zoster and those who visibly soil the environment for whom appropriate hygiene cannot be maintained.

AII

2. Minimize crowding (i.e., maintain a one metre spatial separation) between patients, visitors and workers whenever possible.

AIII

E. *Patient Triage/Cohorting*

1. When Pandemic Phase 2 is declared (see Appendix II) open the following specified *cohort areas/units*[4] in the hospital, as predetermined in the IC/OH Pandemic Plan:

   (a) **Influenza-Like-Illness (ILI), Assessment Area** (see Glossary for definition and Appendix IV for an ILI Assessment tool).

   (b) **Non ILI Assessment Area** (patients require acute care assessment for other conditions).

   (c) **Suspected/Exposed to ILI, In-patient Units.**

   (d) **Confirmed Influenza** (see Glossary for definition), In-patient Units.

   (e) **Not Exposed/Immune* to Influenza, In-patient Units**;

   (f) **Not Exposed to ILI but at very high risk of complications, In-patient Units** (e.g., intensive care areas; nurseries[29-31] or units with severely immunocompromised patients, e.g., transplant recipients[32] hematology/oncology patients[33-35], patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients).

AIII

Note: *Immune are those recovered from the pandemic strain of influenza or those immunized against the pandemic strain of influenza (see Section 3.2.4). As noted, the influenza vaccine may not be 100% efficacious in providing immunity.

2. In acute care settings, (hospitals), triage ILI patients promptly to a separate designated influenza assessment area onsite, to minimize transmission to others in the waiting room.

AIII

3. In acute care settings,(hospitals), triage non ILI patients (but requiring acute care assessment) promptly to specific non ILI waiting and examining areas physically separate from the ILI assessment area to prevent their exposure to ILI.

AIII

F. *Patient Admission*

1. When Pandemic Phase 2 is declared (see Appendix II), eliminate or curtail elective medical and surgical acute care (hospital) admissions and restrict cardiovascular and pulmonary surgery to emergency cases[17].

AIII

2. Patients who have recovered from influenza can be moved into the "Non Influenza" cohort areas after the period of communicability of the pandemic strain has passed.

AIII

3. As the pandemic progresses, the "Suspect/Exposed" Cohort and the "Confirmed Influenza" cohort may be merged.

AIII

4. Maintain cohort principles until the pandemic wave has been declared over.

AIII

G. *Patient Activity Restrictions*

1. Limit movement/activities of patients including transfers within the hospital, unless the patient has recovered from pandemic influenza.

AIII

2. Patients with ILI who are coughing should only leave their room for urgent/necessary procedures.

AIII

3. Patients with ILI who are coughing should wear a surgical mask whenever they need to be out of their room until the period of communicability of the pandemic strain has passed.

AIII

H. *Visitor Restrictions*

1. There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or who have been immunized against the pandemic strain of influenza.

AIII

2. Visitors with ILI should not visit until they are asymptomatic. Close relatives of terminally ill patients can be exempt, but should put a mask on upon entry into the facility and their visit shall be restricted to that patient only.

AIII

3. Visitors should be informed when the acute care facility has influenza activity. Those who have not yet had the pandemic strain of influenza or who have not been immunized against the pandemic strain, should be discouraged from visiting. Close relatives of terminally ill patients can be exempt, but they should restrict their visit to that individual only and they should wash their hands on exit from the patient's room. Wearing a mask upon entry to the facility is only useful if there is no influenza in the community.

AIII

2 Management of Pandemic Influenza in Long Term Care Settings

Interpandemic influenza is a major cause of illness and death in residents of long term care facilities for the elderly, in part, because the resident's age and underlying illness increase the risk of serious complications and, in part, because institutional living increases the risk of influenza outbreaks[24,48,49]. It is reasonable to anticipate that pandemic influenza would have the same impact in long term care settings.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the long term care setting with or without the availability of immunization or chemoprophylaxis.

Recommendations

2.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

Adherence to the recommendations for vaccine and antivirals for residents and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is necessary.

2.2 Control of Pandemic Influenza

A. Physical Setting

When Pandemic Phase 2 is declared (see Appendix II), open the area for the care of residents who will require "acute influenza care" as predetermined in the Infection Control/Occupational Health (IC/OH) Pandemic Plan to minimize transfer to acute care hospitals (also See Section F below and the Preparedness Section of the Canadian Pandemic Influenza Plan).

AIII

B. Management of Staff

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

C. *Infection Control Practices*

1. Using a program to prevent health care-acquired (i.e.nosocomial) infections, long term care facilities should adhere to published guidelines[50,51], including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Staff, residents and visitors should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

   Hand Hygiene procedures should be reinforced according to Appendix III.

   ↑**AII**

   ii. Hands should be washed or hand antisepsis performed after direct contact with residents/workers with ILI (see Appendix IV for ILI an Assessment Tool) and after contact with their personal articles or their immediate environment.

   ↑**AII**

   (b) Hygiene Measures to Minimize Influenza Transmission

   i. Staff, residents and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   ↑**AIII**

   (c) Personal Protective Equipment

   i. Masks

   1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when transmission has entered the community.

      ↑**BIII**

   2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

      ↑**BIII**

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

   BIII

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of residents suspected of having or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

   AIII

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected residents to HCWs and from resident to resident via HCW hands.

   AII

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct resident care.

   AII

4. **Gloves should** be used as an additional measure, not as a substitute for hand hygiene[46,47].

   BII

5. **Gloves** should not be reused or washed[47].

   AII

iii. Gowns

1. **Gowns are not required for the routine care of residents suspected of having or confirmed to have influenza.**

   AI

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and resident care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

   BIII

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

   BIII

(d) Cleaning Disinfection Sterilization of Resident Care Equipment

i. Long term care settings should adhere to the recommendations for cleaning, disinfection and sterilization of resident care equipment as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and*

Sterilization in Health Care[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

AIII

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Long term care settings should adhere to recommendations for housekeeping, laundry and waste management as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

AIII

ii. Equipment and surfaces contaminated with secretions from residents suspected of having or confirmed to have influenza should be cleaned before use with another patient.

BIII

iii. Special handling of linen or waste contaminated with secretions from residents suspected of having or confirmed to have influenza is not required.

AII

D. *Transfer to Acute Care*

1. Residents with influenza (see Glossary for definition) or Influenza-Like Illness (ILI)(see Glossary for definition and Appendix IV for an ILI Assessment Tool) requiring more acute care should *not* be transferred to acute care settings. Such residents should be cared for in "acute influenza care" areas within the LTC facility as described in the IC/OH Pandemic Influenza Plan.

BIII

E. *Admission/Re-Admission*

1. Patients from acute care who have recovered from pandemic influenza or who are immunized against the pandemic influenza strain may be admitted into the LTC facility without restrictions.

AIII

2. Residents who were transferred to acute care and who have recovered from pandemic influenza or who have been immunized against the pandemic influenza strain may be re-admitted into the LTC facility without restrictions.

AIII

3. LTC facilities that have already had pandemic influenza through their facility may admit individuals from the community or acute care without restrictions.

AIII

4. LTC facilities that have remained "influenza free" may admit patients from acute care or the community who have been potentially exposed to influenza. However, such residents must be managed using influenza precautions (maintain one metre of spatial separation, mask if within one metre of the resident and emphasize hand hygiene) for 3 days until past the incubation period if no influenza symptoms occur and until 7 days after the onset of symptoms if influenza develops.

AIII

F. Cohorting

1. Cohorting resident groups (i.e., confirmed/suspected influenza, exposed/not exposed to influenza) is not a feasible measure to control pandemic influenza in a LTC facility. When influenza has been identified in one area of the LTC facility (via residents, staff or visitors) it can be assumed that the facility has been exposed and the following measures should occur:

   (a) Cancel or postpone inside and outside facility procedures, appointments and activities until influenza activity has stopped.

   (b) Encourage coughing residents to remain in their own rooms to prevent the spread of influenza in common areas.

   AIII

G. Visitor Restrictions

1. There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or have received immunization against the pandemic strain of influenza.

   AIII

2. If the LTC facility has remained "influenza free", visitors with ILI (see Glossary for definition and Appendix IV for an ILI Assessment Tool) should not visit until they have recovered. Visitors for terminally ill residents may be exempt, but should put a mask on upon entering the facility and restrict their visit to that resident only.

   AIII

3. Visitors should be informed when the LTC facility has experienced influenza activity. Those visitors who have not yet had the pandemic strain of influenza and are not immunized against the pandemic strain, should be discouraged from visiting. Visitors for terminally ill residents can be exempt, but should restrict their visit to that resident only and wash their hands on exit from the resident's room. Wearing a mask upon entering the facility is only useful if there is no influenza in the community.

   AIII

3 Management of Pandemic Influenza in Ambulatory Care Settings

A comprehensive infection prevention and control program forms the basis for a successful pandemic plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the ambulatory care setting with or without availability of immunization or chemoprophylaxis.

Recommendations

3.1 Prevention of Pandemic Influenza

A. *Immunization and Antivirals*

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan is required.

3.2 Control of Pandemic Influenza

A. *Administration*

1. When Pandemic Phase 2 is declared (see appendix II), non-urgent and routine ambulatory care visits should be cancelled.

   ↑**BIII**

2. Consider creating a dedicated "hot line" to provide consistent pandemic influenza information explaining symptoms of Influenza-like-illness (ILI) (see Glossary for definition and Appendix IV for an ILI Assessment Tool), the purpose of Triage Settings (see Annex G of the Canadian Pandemic Influenza Plan) and Self-care guidelines (See 7.2 and Annex G of the Canadian Pandemic Influenza Plan).

   ↑**AIII**

3. When Pandemic Phase 2 is declared (see Appendix II), open Triage Settings in Ambulatory Care, as described in the Preparedness Section of the Canadian Pandemic Influenza Plan).

   ↑**AIII**

4. Patients attending ambulatory settings for concerns related to ILI should be assessed according to an ILI Assessment Tool, (see Appendix IV).

   ↑**AIII**

B. *Physical Setting*

1. If possible, separate well patients from those with ILI by considering the following strategies: (a) minimizing time spent in waiting rooms; (b) providing separate entrance/waiting areas for patients with ILI; (c) placing patients with ILI directly into a single room; or, (d) separating patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least 1 metre.

   ↑AIII

2. Remove magazines and toys from the waiting rooms.

   ↑AIII

3. Clean equipment and environmental surfaces, potentially contaminated by coughing patients, as frequently as possible, preferably after each patient.

   ↑AII

C. *Management of Staff*

1. Provide education as outlined in Section 4.1.
2. Adhere to Occupational Health Management of staff as outlined in Section 3.5.

D. *Infection Control Practices*

1. Ambulatory care settings should adhere to published infection control guidelines[52-58] to prevent infections, including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Staff, patients and those attending to a patient should recognize that **strict adherence to hand washing/ hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.** Hand hygiene procedures should be reinforced according to Appendix III.

   ↑AII

   ii. Hands should be washed or hand antisepsis performed after direct contact with ILI patients, after contact with their personal articles or their immediate environment.

   ↑AII

   (b) Hygiene Measures to Minimize Influenza Transmission

   i. Ambulatory care workers and their patients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑**AIII**

(d) Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

   ↑**BIII**

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

   ↑**BIII**

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

   ↑**BIII**

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Masks should be worn, as outlined in Section 2.6

ii. Gloves

1. **Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza.** Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

   ↑**AIII**

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient to patient via HCWs' hands.

   ↑**AII**

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct patient care.

   ↑**AII**

4. **Gloves should be** used as an additional measure, not as a substitute for hand hygiene[46,47].

   ↑**BII**

5. **Gloves** should not be reused or washed[47].

   ↑**AII**

iii. Gowns

1. **Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.**

   ↑AI

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and resident care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

   ↑BIII

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

   ↑BII

E. Patient Activity/Transport

Patients with ILI should not leave the ambulatory care area, except for essential procedures.

↑AIII

4 Management of Pandemic Influenza in Home Care Settings (Care Provided by Regulated and Unregulated HCWs)

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the home care setting with or without availability of immunization or chemoprophylaxis.

Recommendations

4.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

1. Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is necessary.

4.2 Control of Pandemic Influenza

A. Physical Setting

1. When Pandemic phase 2 (see Appendix II) is declared, cancel home care visits that are not absolutely necessary.

   ↑BIII

B. *Management of Staff*

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management of staff as outlined in Section 3.5.

C. *Infection Control Practices*

1. Home care settings should adhere to published infection control guidelines[59-62] including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].
2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. HCWs, clients and household members should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.** Hand hygiene procedures should be reinforced according to Appendix III.

   AII

   ii. Hands should be washed or hand antisepsis performed following direct contact with a client with ILI, articles contaminated by the client and the client's immediate environment.

   AII

   iii. If running water is not available or when hand-washing facilities are inaccessible, use the following steps for effective hand antisepsis:

      - Apply an alcohol-based hand hygiene product to dry hands (moisture dilutes the alcohol) and rub vigorously for the period of time specified by the manufacturer, or until dry.
      - If there is heavy microbial soiling, first wipe hands with a towelette to remove visible soiling.

   AI

   (b) Hygiene Measures to Minimize Influenza Transmission

   Home care workers and their clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   AIII

(c) Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

   BIII

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing clients.

   BIII

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

   BIII

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of clients suspected of having or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

   AIII

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

   AII

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct client care.

   AII

4. **Gloves should be used as an additional measure,** not as a substitute for handwashing[46,47].

   BII

5. **Gloves** should not be reused or washed[47].

   AII

iii. Gowns

1. Gowns are not required for the routine care of clients suspected of having or confirmed to have influenza.

   AI

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely

to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

BIII

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

BIII

D. Triage

1. Perform an ILI assessment (see appendix IV for an ILI Assessment Tool and glossary for definition of ILI) of the client and their household contacts by phone (if possible) prior to the appointment or before going into the home. Assess the risk of influenza in the client or household contacts

AIII

2. Provide clients and family members with information regarding symptoms of ILI and Self Care Guidelines and the purpose of Triage Settings (see Annex G of the Canadian Pandemic Influenza Plan).

AIII

3. Counsel clients and household contacts to avoid public gatherings to minimize exposure.

E. Visitors

1. Only well (asymptomatic/unexposed) visitors should visit severely immunocompromised patients in the home, e.g., transplant recipients[32], hematology/oncology patients[33-35], patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients as these patients are at risk of serious complications if infected with influenza.

AIII

2. Visitors for the terminally ill can be exempt.

AIII

5 Management of Pandemic Influenza in Community Settings

5.1 Management of Pandemic Influenza in Emergency Responder Settings

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Emergency Responders (see Glossary for definition) are to be a priority group to receive influenza vaccination and chemoprophylaxis when, and if, it is available during a pandemic. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Recommendations

A. *Pandemic Planning*

1. Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in the emergency responder setting is assigned to a specific individual.

   AIII

2. Management should develop an interpandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.

   AIII

3. Provide education, as outlined in Section 4.1.
4. Occupational Health management of emergency responder workers should be in keeping with OH Section 3.5.

B. *Control of Pandemic Influenza*

1. **Immunization/Chemoprophylaxis**

   In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential workers (including EMS) will be given high priority for immunization when vaccine is available (see Annexes D and E of the Canadian Pandemic Influenza Plan).

2. **Infection Control Practices**

   Emergency Service Workers should adhere to routine infection control practices[5,63,64]. All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

   Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   Hand hygiene procedures should be reinforced according to Appendix III.

   AII

   ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

   AII

   iii. Waterless antiseptic hand rinses are superior to soap and water for reducing hand contamination[65-68] and should be made available as an alternative to hand washing. Antiseptic hand rinses are especially useful when time for hand washing or access to sinks is limited.

BIII

iv. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes.

BIII

v. Wearing gloves does not eliminate the need for proper hand hygiene after care is rendered. As soon as feasible, hands must be washed after the removal of gloves.

AI

(b) Hygiene Measures to Minimize Influenza Transmission

i. Emergency Responders should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

AIII

(c) Personal Protective Equipment

i. Masks

1. **Masks may be worn to minimize the transmission of influenza** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

BIII

2. Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

BIII

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

BIII

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of patients suspected or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

AIII

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous

membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

↑AII

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct patient care.

   ↑AII

4. **Gloves should be used as an additional measure,** not as a substitute for hand hygiene[46,47].

   ↑AII

5. **Gloves** should not be reused or washed[47].

   ↑AII

iii. Gowns

1. Gowns are not required for the routine care of patients with ILI.

   ↑AI

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

   ↑BIII

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

   ↑BIII

(d) Patient Triage

Whenever feasible, personnel responsible for answering emergency calls related to influenza-like-illness (ILI) should triage patients according to an ILI Assessment Tool (see Appendix IV).

↑AIII

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Emergency Responders should adhere to the recommendations for housekeeping, laundry and waste management, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑AIII

ii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

↑BIII

iii. Special handling of linen or waste contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.

↑AII

(f) Patient Care Equipment (Cleaning Disinfection Sterilization)

i. Emergency Responders should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

AIII

5.2 Management of Pandemic Influenza in Mortuary Care Settings

The risk of influenza transmission to Funeral Service Workers will be through their contact with families and friends of the deceased, not the deceased. There is no additional risk of transmission of influenza to funeral home workers related to handling of bodies of persons suspected of having or confirmed to have died from influenza. Deceased bodies (confirmed of having or suspected to have influenza during interpandemic or pandemic years) require routine handling only. Infection control recommendations for Funeral Services Profession have been published[9,69].

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Recommendations

A. Planning for Pandemic Influenza

1. Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in a funeral home setting is assigned to a specific individual; preferably an individual who has had professional training.

AIII

2. Management should develop an interpandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
3. Management should provide education as outlined, in Section 4.1.

B. Control of Pandemic Influenza

Immunization/Chemoprophylaxis

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential workers (including funeral service workers) will be given high priority for immunization when vaccine is available (see Annexes D and E of the Canadian Pandemic Influenza Plan).

Infection Control Practices

1. Funeral Service Workers should adhere to routine infection control practices[9,69] in the handling of all deceased bodies regardless of the confirmed or suspected cause of death.

All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

↑AIII

(a) Hand Hygiene

i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

Hand hygiene procedures should be reinforced according to Appendix III.

↑AII

ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

↑AII

(b) Hygiene Measures to Minimize Influenza Transmission

i. Funeral Service Workers should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑AIII

(c) Personal Protective Equipment

i. Masks

1. Wearing masks when handling bodies suspected of having or confirmed to have influenza during a pandemic to minimize the transmission of influenza is not required.

↑BIII

2. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

↑BIII

5.3 Management of Pandemic Influenza in Child Care Settings

Infectious diseases occur with increased frequency in child care settings. The incidence is affected by the age and immune status of children, the number of children and group size, the degree of close contact between children and attendants and the hygienic habits of children and attendants. Infections acquired in the child care setting may spread to attendants, family members and the community.

Influenza in child care settings can be significant because viral shedding in the nasal secretions usually continues for about 7 days from the onset of illness and can be more prolonged in young children[23]. Attack rates of influenza in healthy children have been estimated at 10%-40% each year, with approximately 1% resulting in hospitalization.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the child care setting with or without availability of immunization or chemoprophylaxis.

Recommendations

Planning for Pandemic Influenza

1. One person in the program must be designated as the individual responsible for the Infection Control (IC)[70] and Occupational Health (OH) program.

   AIII

2. Management should develop an interpandemic influenza plan and review it annually. In addition, an IC/OH Pandemic Influenza Plan should be developed, as outlined in Section 3.1 and reviewed every 3 years.
3. Education should be provided, as outlined in Section 4.2.

Control of Pandemic Influenza

A. *Immunization/Chemoprophylaxis*

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. (See Annexes D and E of the Canadian Pandemic Influenza Plan).

B. *Infection Control Practices*

1. Child Care Workers should adhere to routine infection control practices[71-77] including procedures for washing toys.

   (a) Hand Hygiene

   1. Workers, children and their families should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.

      AII

   2. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see glossary for definition and Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

      AII

   (b) Hygiene Measures to Minimize Influenza Transmission

   1. Child care workers, children and their families should be encouraged to minimize potential influenza transmission through good hygienic measures, ie. use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

      AIII

(c) Masks

1. Wearing masks, when face-to-face with coughing children/individuals, to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

BIII

(d) Staff/Child Management

Child care settings may be closed depending on the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications (see Section 5.).

1. Children:
   a. When pandemic phase 2 has been declared (see Appendix II), do not send children to day care if at all possible until the pandemic phase has ended; the child has recovered from ILI (see Glossary for definition, Appendix IV for an ILI Assessment Tool) or the pandemic has gone through the child care centre.
   b. Do not send children with signs of ILI to day care and notify the day care of the reason for their absence (unless the pandemic has gone through the centre).
   c. Do not send children who have been exposed in the past 3 days to an individual with ILI, (unless the pandemic has gone through the centre), to day care.

AIII

2. Staff

(a) Inform Public Health authorities of staff absence(s) due to ILI.

Ideally, staff with ILI should not go to work until their symptoms have resolved.

AIII

5.4 Management of Pandemic Influenza in Schools and Student Residences

Risk of influenza transmission in schools can increase with crowded classrooms, poor ventilation and limited emphasis on hygienic practices. Dormitory living enhances this risk due to increased numbers of those considered to be household contacts.

Recommendations

(a) Planning for Pandemic Influenza

1. Health Services in residence settings should develop an interpandemic influenza plan and review it annually. In addition, an Infection Control (IC) and Occupational Health (OH) Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.

   Education should be provided, as outlined in Section 4.2.

(b) Control of Pandemic Influenza

1. Immunization/Chemoprophylaxis

   In the early phases of the pandemic, vaccine and antivirals may not be readily available. (See Annexes D and E of the Canadian Pandemic Influenza Plan).

2. Infection Control Practices

   a. Hygiene Measures to Minimize Influenza Transmission

      i. Staff, students and their household members should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

         Hand hygiene procedures should be reinforced according to Appendix III.

         ↑**AII**

      ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see Glossary for definition, see Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

         ↑**AII**

      iii. Staff, students and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

         ↑**AI**

   b. Masks

      i. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

         ↑**BIII**

   c. Staff/Student Management

      i. Schools may be closed depending upon the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications (See Section 5.0).

         ↑**AIII**

      ii. When pandemic phase 2 is declared (see Appendix II) consider the following:

   Students

      i. When pandemic phase 2 has been declared do not send students to school if at all possible until the pandemic phase has ended; the student has recovered from ILI (see Glossary for definition and Appendix IV for an ILI Assessment Tool) or, the pandemic has gone through the school.

ii. Do not send students who have been exposed in the past 3 days to an individual with ILI to school unless the pandemic has already been through the school/residence.

iii. Do not send children with signs of ILI to school (unless the pandemic has gone through the school) and notify the school of the reason for their absence.

iv. Well students should avoid contact with students who have ILI (e.g., not visit in rooms of symptomatic students).

AIII

Staff

i. Inform Public Health authorities of absence(s) due to ILI.

ii. Ideally, staff with ILI should not go to work until their symptoms have resolved.

AIII

Resident Health Services

i. Assess symptomatic students according to an ILI Assessment Tool, see Appendix IV.

ii. Encourage students with ILI who are well enough to remain in residence to remain in their room while symptomatic (e.g., not congregate in common areas).

AIII

5.5 Management of Pandemic Influenza in Workplaces

Planning for Pandemic Influenza

1. Provide education, as outlined in section 4.2 of Part A.

Control of Pandemic Influenza

A. Immunization/Chemoprophylaxis

1. Immunization will not be available to the general public in the early phases of the pandemic. See Annex D of the Canadian Pandemic Influenza Plan.

B. Hygiene Measures to Minimize Influenza Transmission

1. Workers and their household contacts should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   Hand hygiene procedures should be reinforced according to Appendix III.

   AII

2. Hands should be washed or hand antisepsis performed after direct contact with individuals suspected of having or to have confirmed influenza and after contact with their personal articles or their immediate environment.

   AII

3. Workers and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and understanding the importance of keeping hands away from the mucous membranes of the eyes and nose.

AIII

Masks

1. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

BIII

Education

1. Provide education, as outlined in Section 4.2 of Part A.

5.6 Management of Pandemic Influenza in Shelters

The risk of influenza transmission in a shelter setting during a pandemic will be high because of the crowded physical conditions, inadequate health and hygiene of clients and the reduced priority for immunization or chemoprophylaxis in this population.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. The promotion of hand washing and hygienic practices is imperative to minimize the transmission of influenza and other infectious diseases in the shelter with or without availability of immunization or chemoprophylaxis during a pandemic. Guidelines for Infection Control in shelters have been published[78-81].

Recommendations

Planning for Pandemic Influenza

1. Designate one person responsible for the infection control program[78,80] and liaise with local public health. The program should prevent or minimize the occurrence and transmission of communicable diseases such as influenza[79,81].

   AIII

2. An interpandemic influenza plan should be developed and reviewed annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
3. Shelters that are in the process of being planned should pay special attention to the number and placement of hand washing sinks and methods to reduce overcrowding[80,81].

   AIII

4. Provide education, as outlined in Section 4.2.

Control of Pandemic Influenza

A. *Immunization/Chemoprophylaxis*

1. Immunization may not be readily available to this setting in the early phases of the pandemic (See Annexes D and E of the Canadian Pandemic Influenza Plan).

B. *Infection Control Practices*

Hygiene Measures to Minimize Influenza Transmission

1. Workers and clients should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   When planning for a pandemic, operators should ensure that adequate supplies of hand hygiene products is a high priority as there may be an interruption to the supply or shortages of soap and hand towels.

   Hand hygiene procedures should be reinforced according to Appendix III.

   AII

2. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see Glossary for definition, see Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

   AII

3. Workers and clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   AII

Masks

1. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community (also see Section 2.6).

   BIII

Triage

1. Clients and workers with influenza-like illness should be assessed using an ILI Assessment Tool, (see Appendix IV).

   AIII

5.7 Management of Pandemic Influenza in Correctional Facilities

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Planning for Pandemic Influenza

1. Designate one person responsible for the infection control program and liaise with local public health authorities. The program should prevent or minimize occurrence and transmission of communicable diseases such as influenza. **AIII**

2. Develop an interpandemic influenza plan and review it annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed, as outlined in Section 3.1 and reviewed every 3 years. **AIII**

3. See Section 3.5 for Occupational Health management of correctional workers. **AIII**

4. When Pandemic Phase 2 is declared (see Appendix II), provide additional education to health care workers and inmates, as outlined in Section 4.0. **AIII**

Control of Pandemic Influenza

A. Immunization/Chemoprophylaxis

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential service workers (including correctional officers) will be given high priority for immunization when vaccine is available. See Annexes D and E of the Canadian Pandemic Influenza Plan.

B. Infection Control Practices

1. Adhere to published infection control recommendations for correctional settings. **AIII**

Hygiene Measures to Minimize Influenza Transmission

1. Workers and inmates should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   When planning for a pandemic, administrators should make ensuring adequate supplies of hand hygiene products a priority as there may be an interruption to the supply or shortages of soap and hand towels. Hand hygiene procedures should be reinforced according to Appendix III. **AII**

2. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment. **AII**

3. Workers and inmates should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose. **AIII**

Masks

1. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community (also see Section 2.6). **BIII**

Triage/Cohorting

1. Provide a separate triage area to assess inmates and workers with ILI (see Glossary) according to an ILI Assessment Tool, (see Appendix IV). **BIII**

2. Place inmates with ILI in cohort units/areas whenever possible. Good hygiene should be emphasized. **BIII**

Visitors

1. Visitors with febrile respiratory illness should be discouraged from visiting if there is no pandemic activity in the facility. **AIII**

2. Visitors should be made aware of pandemic activity in the facility and discouraged from visiting unless they have recovered from ILI or been immunized against the pandemic strain of influenza. **AIII**

Part C. Infection Control and Occupational Health in Non Traditional Settings during an Influenza Pandemic

I Infection Control and Occupational Health in Triage Settings

Upon declaration of WHO pandemic phase 2 (see Appendix II), triage settings will be established in locations as predetermined in the Canadian Pandemic Influenza Plan. The purpose of triage settings is to facilitate efficient and consistent assessment for those with influenza-like illness (ILI) (see Glossary for definition and see Appendix IV for an ILI Assessment Tool).

It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces[14]. **The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

There is evidence that overcrowding has contributed to the transmission of respiratory-transmitted infections[82]. Crowding and breathing recycled air was identified as risk factors for influenza transmission in a grounded airplane[18] and in a long term care facility[83].

Recommendations

1.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is required.

1.2. Control of Pandemic Influenza

A. Physical Setting

1. When Pandemic Phase 2 is declared (see Appendix II), open triage settings in hospitals and community locations as predetermined in the Preparedness Section of the Canadian Pandemic Influenza Plan.

AIII

2. When planning for the location of a triage setting, emphasize the need for spatial separation between patients, those accompanying them and care givers/triage workers.

AII

   a. Ideally, triage settings should only be placed in an area that has a well maintained ventilation system.

   AII

   b. Prevent crowding in triage settings by ensuring ample room is available in waiting and assessment areas in order to maintain spatial separation of at least 1 metre.

   AII

   c. Consider the need for a separate area for temporary storage of deceased bodies.

   AIII

B. *Management of Staff*

1. Adhere to Occupational Health Management, as outlined in Section 3.5.
2. Provide education, according to Section 4.1 of Part A.

C. *Infection Control Practices*

1. Hygiene Measures to Minimize Influenza Transmission

   a. Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   AIII

   b. To prevent nosocomial infections, triage settings should adhere to published guidelines[6,9,84]. Infection Control Practices adapted from Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*[3] are summarized below:

2. Hand Hygiene

   a. Staff, patients and visitors should recognize that strict adherence to hand hygiene recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   Hand hygiene procedures should be reinforced according to Appendix III.

   AII

   b. Hands should be washed or hand antisepsis performed after direct contact with ILI patients and after contact with their personal articles or their immediate environment.

   AII

   c. Ideally, hand washing facilities should be conveniently located throughout the triage setting. Sinks for hand washing should be used only for hand washing and not for any other purpose, e.g., as a utility sink. There should be access to adequate supplies and soap and towel dispensers in good working order, or liberal use of waterless hand antiseptic agents[85-87].

BII

d. Plain soap may be used for routine hand washing[88,89].

BII

e. Hand antisepsis with an antiseptic soap or antiseptic hand rinse is indicated[88,90] before performing invasive procedures such as starting an intravenous (maximal barrier technique in addition to hand antisepsis is required for insertion of central lines).

BIII

f. When access to sinks is limited, antiseptic hand rinses should be used. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination[66-68,91] and should be made available.

AIII

g. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes[92].

BIII

h. Health Care Workers can reduce the frequency of hand washing required by minimizing unnecessary direct contact with patients and their immediate environments.

BIII

i. Hands must be washed[93,94]:

    i. between patients,
    ii. after contact with blood, body fluids, secretions (e.g., respiratory secretions),
    iii. after contact with items known or considered likely to be contaminated with blood, body fluids, secretions (e.g., respiratory secretions), or excretions,
    iv. immediately after removing gloves[46],
    v. between certain procedures on the same patient in which soiling of hands is likely, to avoid cross-contamination of body sites[91,95],
    vi. when hands are visibly soiled.

AII

j. Hand lotion may be used to prevent skin damage from frequent hand washing[96]. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of skin lotions for patient's and care giver's use have been reported as sources of outbreaks[97-101].

BII

k. Liquid hand wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

AII

3. Personal Protective Equipment

a. Masks, Eye Protection and Face Shields

i. Masks and eye protection, or face shields should to prevent the transmission of influenza should be worn by triage personnel when face-to-face with individuals for ILI assessment.

BIII

ii. Masks and eye protection, or face shields should be worn by triage personnel to prevent exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

BIII

iii. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

iv. Masks should be worn by triage personnel to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

BIII

v. Wear masks, as outlined in Section 2.6

b. Gloves

i. Gloves are not required for the routine care of patients suspected of having confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

AIII

ii. Appropriate use of clean, non-sterile gloves includes[9,44,102-105]:

a. for contact with blood, body fluids, secretions (e.g., respiratory secretions) and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or exudative rash);

b. when handling items visibly soiled with blood, body fluids, secretions (e.g., respiratory secretions) and excretions;

c. when the health care worker has open skin lesions on the hands.

AII

iii. Gloves should be used as an additional measure, not as a substitute for hand washing[46,47].

BII

iv. When indicated, gloves should be put on directly before contact with the patient or before the procedure requiring gloves[95,106,107].

AII

v. Potentially contaminated gloves should be removed and disposed of immediately after completion of care, procedure or specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs)[46,95,106-108].

AII

vi. Hands should be washed immediately after removing gloves[46,47].

AII

vii. Single-use disposable gloves should not be reused or washed[46].

↑**AII**

c. Gowns

i. Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.

↑**AI**

ii. Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑**BIII**

iii. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

↑**BIII**

4. Environmental Control
(Patient Care Equipment, Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14].

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient.

Recommendations

a. Process

i. "Parent" organizations must provide a specially trained, knowledgeable person to be responsible for the reprocessing patient care equipment, housekeeping, laundry and waste services. Where there is no "parent" organization to plan or operate the triage settings, it is expected another organization would assume this role.

↑**AIII**

ii. Reprocessing (i.e., disinfection or sterilization) equipment is not recommended in the Triage Setting but if considered, the "parent" organization must provide a specially trained, knowledgeable person to be responsible for the processes. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and the safe handling/transport of contaminated equipment.

↑**AIII**

iii. Procedures should be established for assigning responsibility and accountability for the routine cleaning of all patient care equipment[109-112] and housekeeping services.

↑**BIII**

iv. Reuse of single use items is strongly discouraged.

↑AII

b. Patient Care Equipment (Cleaning, Disinfection and Storage)

i. Equipment that touches the patient's intact skin should be clean. Equipment that is shared should be cleaned between patients. A hospital grade germicide should be used for routine cleaning. Pleases refer to Appendix V, Table A Cleaning Procedures for Common Items.

↑BIII

ii. Equipment that is visibly soiled should be cleaned promptly.

↑BIII

iii. Soiled equipment should be handled in a manner that prevents exposure of the skin and mucous membranes and contamination of clothing and the environment.

↑BIII

iv. Reuseable equipment touching mucous membranes, e.g., respiratory therapy equipment or equipment contacting non-intact skin, should be discarded or it should be treated appropriately using high level disinfectant between patients[3,113-116].

↑AIII

v. Reuseable equipment must be thoroughly cleaned (washed with hot soapy water, using an enzymatic cleaner), rinsed and dried before disinfection or sterilization[117] and dried before storage.

↑AII

vi. Manufacturers' written recommendations for use of chemical disinfectant should be strictly followed.

vii. Only disinfectants with a DIN (disinfectants approved for use in Canada) should be used.

viii. Sterile items must remain sterile until they are used[118-120].

↑AII

ix. Sterile and clean supplies should be stored in a clean dry area.

↑AII

c. Housekeeping

i. Surfaces that are frequently touched by the hands (i.e., contaminated) of health care providers and patients/residents/clients, such as the surfaces of medical equipment and knobs for adjustment or opening, should be cleaned at least twice daily and when known to be contaminated, i.e., after use[121-123].

↑BIII

ii. Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.

↑AII

iii. A barrier (sheet or paper) should be placed on the examining or procedure table and changed between patients. Alternatively, the table should be cleaned between patients.

↑BIII

d. Laundry (linen)

i. When reusable linen is used, it should be changed between patients. Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.

AII

e. Waste

i. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required.

AII

ii. Used needles and other sharp instruments should be handled with care to avoid injuries during disposal or reprocessing. Used sharp items should be disposed of in designated puncture-resistant containers located in the area where the items were used[9,124,125].

AIII

5. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

i. Adherence to routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above for handling a deceased body, is highly recommended.

AIII

ii. The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until picked up by funeral services.

AIII

2 Infection Prevention and Control in Self Care Settings (Care provided by Self, Family or Friends/Volunteers)

Providing care to an individual with influenza like-illness (ILI) who are well enough to be cared for at home will be common during an influenza pandemic. Care may be provided by family members, neighbors, volunteers or individuals themselves. Therefore, adapting Routine Practices to the home setting to prevent transmission of other infections (including blood borne pathogens) to those providing care is necessary.

It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces[14]. **The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

Recommendations

2.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

Adherence to recommendations for vaccine and antivirals for patients and individuals providing self care as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan.

2.2 Control of Pandemic Influenza

A. Physical Setting

1. When Pandemic Phase 2 is declared (see Appendix II), Triage Settings will be opened as indicated in the Preparedness Section of the Canadian Pandemic Influenza Plan. Patients with influenza-like-illness (ILI) (see an ILI Assessment Tool, Appendix IV) not directed to hospital or temporary influenza settings and will be provided with Self Care guidelines. **AIII**

2. In the home setting, it is recommended that an attempt be made to maintain spatial separation of one metre unless providing direct care. Where feasible, the individuals with ILI (see glossary) should stay in their room. **BII**

3. In a household where well (non-ILI) individuals (e.g., an elderly or immunocompromised person, or an infant) require care, it is important to provide their care prior to caring for individuals with ILI. **AIII**

B. Management of Individuals Involved in Self Care

1. Provide education as outlined in Section 4.2 of Part A .

C. Infection Control Practices

To prevent the transmission of infections, individuals providing care should adhere to the following recommendations adapted from *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*[3].

1. Hand Hygiene
    a. Wash hands before, and after, the care of the individual who has ILI. See Appendix III.

       AII

    b. Plain soap may be used for hand washing[88,89]. Soaps containing antiseptics are not required.

       BII

    c. Bar soap should be stored in such a manner as to allow for drying after use. Liquid hand wash products should be stored in clean closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

       AII

    d. A waterless antiseptic hand rinse for hand hygiene should be used if hand washing facilities (sink and running water) are inaccessible[66-68,91]. If there is visible soiling of the hands, first wipe with detergent containing towelettes, then use the antiseptic hand rinse[92].

       AI

2. Personal Protective Equipment
    a. Masks, Eye Protection and Face Shields
        i. Masks to prevent the transmission of influenza are not helpful when transmission has entered the community.

           BIII

        ii. Wear masks and eye protection, or face shields to protect the mucous membranes of the eyes, nose and mouth during procedures and care activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,44,45].

           BIII

        iii. Avoid touching the eyes with the hands to prevent self-contamination with pathogens.
        iv. Wear masks, as outlined in Section 2.6.
    b. Gloves
        i. Gloves are not routinely necessary in the care of an individual with ILI. Hand washing is sufficient.

           AIII

        ii. Gloves are an additional measure to protect hands from soiling with secretions and excretions but are not a substitute for hand washing.

           AIII

iii. Individuals should avoid touching the mucous membranes of their eyes and mouth with their hands; especially when providing care to individuals with ILI.

↑**AIII**

iv. Dishwashing or utility household gloves may be worn in place of single-disposable medical gloves. They should be used by one individual only and washed and dried between use.

↑**AIII**

v. Single-use disposable medical gloves should not be reused or washed[47].

↑**AII**

vi. Single use plastic bags can also be used as gloves to protect hands from gross soiling.

↑**AIII**

vii. Appropriate use of clean non-sterile gloves includes the following[9,44,102,103,105]:

a. for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open lesion or oozing rash),

b. when handling items visibly soiled with blood, body fluids, secretions and excretions,

c. when the care provider has open skin lesions on the hands.

↑**AII**

viii. Gloves should be removed immediately after completion of the procedure for which they were worn and before touching clean environmental surfaces[95,106,107].

↑**AII**

viv. Hands should be washed immediately after removing gloves[46,47]. If not gloves are available, plastic bags may be worn as gloves.

↑**AI**

c. Gowns

i. Over-garments such as aprons, or gowns are not required for the care of an individual with ILI.

↑**AI**

ii. Over-garments should be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45] (also see laundry instructions below).

↑**BIII**

iii. Caregivers should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

↑**BIII**

3. Environmental Control (Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14]. Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another individual.

a. Housekeeping

   i. Environmental surfaces and objects that have been touched by an individual with ILI or the caregiver should be cleaned daily with a regular household cleaning agent.

   AII

   ii. Products that are labeled "antibacterial" are not necessary.

   AIII

b. Laundry

   i. Special handling of clothing or linen used during the care of an individual with ILI is not necessary.

   BIII

   ii. Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle[126,127]. Large amounts of solid soil, feces, or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.

   BIII

   iii. Use of a commercial laundry detergent with household bleach (according to product instructions and where suitable for fabrics) and a normal machine wash and machine dry are sufficient to clean soiled linen in a home care setting[50,128-131].

   BIII

   iv. Machine drying or hanging clothing and linens on a clothes line at the home care site is a suitable method for drying.

   BIII

c. Waste

   i. Garbage generated during the care of an individual with ILI does not require special handling and may be placed with household waste for disposal.

   AIII

   ii. Medical sharps, i.e hypodermic needles used in the care of an individual with ILI should be placed in an impervious container (e.g., coffee can) with household waste prior to disposal

   AII

4. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

a. Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use as outlined above during the care of the deceased body is recommended.

↑AIII

b. Individuals who die in a home setting should be wrapped in a sheet (ideally using a plastic bag to protect the mattress) and preferably kept in a cool, dry location until pick up by funeral services.

↑AIII

3 Infection Control and Occupational Health in Temporary Influenza Hospitals

Patients triaged as unable to be cared for at home and not ill enough for an acute care hospital will be sent to Temporary Influenza Hospitals as predetermined in the Canadian Pandemic Influenza Plan. Therefore, patients in these settings will either be ill with the pandemic strain of influenza or will have recovered from the pandemic strain of influenza; thus, patient-to patient transmission of influenza will not be a concern. In this setting, the risk of acute infections other than influenza (e.g., gastroenteritis, other respiratory infections, ectoparasites) will be of concern. Adherence to current Infection Control Guidelines to prevent the transmission of infection is required[3,5,6,9,84].

It is important to note that the influenza virus can survive on hands for up to 5 minutes following the transfer from environmental surfaces[14]. **The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during, or even late, in the pandemic.

Maintaining spatial separation of at least 1 metre between patients in this setting should be maintained because there is evidence that overcrowding has contributed to the spread of respiratory-transmitted infections[82].

Recommendations

3.1 Prevention of Pandemic Influenza

A. Immunization and Antivirals

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is vital.

3.2 Control of Pandemic Influenza

A. *Physical Setting*

1. When Pandemic Phase 2 is declared (see Appendix II), open Temporary Influenza Hospitals as predetermined in the Canadian Pandemic Influenza Plan.

↑**AIII**

2. When planning for the location of a temporary influenza hospital, emphasize the need for spatial separation between patients, their families and care givers.

↑**AII**

3. Maintain at least a 1 metre spatial separation between beds in patient care areas and chairs in waiting areas[82].

↑**AII**

4. Plan for separate soiled and clean utility rooms; clean storage areas; dedicated sinks for utility purposes versus hand washing; designate food preparation areas including, dedicated utility versus hand washing sinks; provide an adequate number of toilets; set p a bereavement room and a location to store deceased bodies prior to pick up for funeral services.

↑**AII**

5. Settings with carpeted floors are discouraged.

↑**BIII**

B. *Management of Staff*

1. Provide education, as outlined in section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

C. *Infection Control Practices*

1. Hygiene Measures to Minimize Influenza Transmission
    a. Temporary Influenza hospitals should adhere to published guidelines[3,6,9] to prevent nosocomial infections. Infection Control Practices adapted from Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] are summarized below:
    b. Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and keeping their hands away from the mucous membranes of the eyes and nose.

↑**AIII**

2. Hand Hygiene
    a. Staff, patients and visitors should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.

↑**AII**

b. Hands should be washed or hand antisepsis performed after direct contact with ILI patients (see Glossary) and after contact with their personal articles or their immediate environment.

↑**AII**

c. When planning for the location and operation of a Temporary Influenza Hospital, it is important to note that, ideally, hand washing facilities should be conveniently located.

Note: See g. below if hand washing facilities are not available.

↑**BII**

d. Hand washing facilities should be available in, or adjacent to rooms where care is provided. If a large room is used for several patients, more than one sink may be necessary. Sinks for hand washing should be used only for hand washing and not for other purposes, e.g., as a utility sink. There should be access to adequate supplies as well as soap and towel dispensers should be in good working order[85-87].

↑**BII**

e. To avoid re-contaminating hands, single-use towels should be supplied for users to turn off faucets.

↑**BIII**

f. Plain soap may be used for routine hand washing[89,132].

↑**BII**

g. When access to sinks is limited, supplies of antiseptic hand rinses and detergent containing towelettes are necessary. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination[66-68,91] and should made available in prominent areas throughout the temporary hospital.

↑**AI**

h. If there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes[92].

↑**BIII**

i. Health Care Workers can reduce the required frequency of hand washing by minimizing unnecessary direct contact with patients and their immediate environments. This can be accomplished by the organization of care activities and avoiding touching surfaces in the patient's environment, e.g., bedrails, tabletops.

↑**BIII**

j. Hands must be washed[93,94] or antiseptic hand rinse used in the following situations:

   i. after any direct contact with a patient or their immediate environment and before contact with the next patient;

   ii. after contact with items known or considered likely to be contaminated with blood, body fluids, secretions, or excretions (e.g., bedpans, urinals, wound dressings, suction apparatus);

   iii. immediately after removing gloves[46];

   iv. between certain procedures on the same patient if soiling of hands is likely, to avoid cross-contamination of body sites[91,95];

        v. before preparing, handling, serving or eating food and before feeding a patient;
        vi. when hands are visibly soiled; and,
        vii. after personal use of toilet, wiping nose, coughing or sneezing.

↑**AII**

k. Patients and family members and visitors should be taught how and when to wash their hands, e.g., after personal use of toilet, wiping nose, coughing or sneezing.

↑**AII**

l. When patient hygiene is poor, they should have their hands washed for them. Patients should be helped to wash their hands before meals, after going to the bathroom, when soiled and before leaving their bedspace.

↑**BIII**

m. Hand antisepsis, with an antiseptic soap or antiseptic hand rinse, is indicated before performing invasive procedures[92,132].

↑**BIII**

n. Hand lotion may be used to prevent skin damage from frequent hand washing[96]. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of patients' or care givers' skin lotions have been reported as a source of outbreaks[97-101].

↑**BII**

o. Liquid hand-wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

↑**AII**

3. Personal Protective Equipment

    a. Masks, Eye Protection, and Face Shields

        i. Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals in during the early phases of the pandemic but are not practical, or helpful, when transmission has entered the community and temporary hospitals have been opened.

↑**BIII**

        ii. Masks should be worn in the temporary influenza hospital to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

↑**BIII**

        iii. Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑**BIII**

        iv. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
        v. Wear masks, as outlined in Section 2.6.

b. Gloves

i. Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

AIII

ii. Gloves should be used as an additional measure, not as a substitute for hand hygiene[46,47].

BII

iii. Gloves are not required for routine patient care activities in which contact is limited to a patient's intact skin, e.g., when transporting patients.

BIII

iv. Appropriate use of clean non-sterile gloves includes the following situations[9,44,102-105]:

  a. for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or oozing rash);

  b. for handling items visibly soiled with blood, body fluids, secretions or excretions;

  c. when the health care worker has open skin lesions on the hands.

AII

v. When indicated, gloves should be put on directly before contact with the patient or just prior to starting the task or procedure requiring gloves[95,106,107].

AII

vi. Gloves should be changed between care activities and procedures with the same patient after contact with materials that may contain high concentrations of microorganisms[46,95], e.g., after handling an indwelling urinary catheter.

BIII

vii. Worn gloves should be changed:

  a. between patient contacts,

  b. if a leak is suspected or the glove tears.

AII

viii. Potentially contaminated gloves should be removed and disposed of immediately after completion of care or a specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs)[46,95,106,107,133].

AII

ix. Hands should be washed immediately after removing gloves[46,47].

AII

x. Single-use disposable gloves should not be reused or washed[47].

AII

c. Gowns

i. Gowns are not required for the routine care of patients with suspected or confirmed to have influenza.

↑**AI**

ii. Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑**BIII**

iii. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible thoroughly, but gently, with soap and warm running water.

↑**BIII**

D. Patient Activity Restrictions

1. There are no patient activity restrictions as patients and staff will have already been exposed to or infected with influenza.

↑**AIII**

E. Visitor Restrictions

1. Notices should be placed at the entrances to the temporary hospital:

   a. warning visitors that they may be at risk of acquiring influenza and requesting visitors who have not had influenza-like-illness not to visit. Close relatives of terminally ill patients are exempt.

   b. requiring that visitors with acute respiratory illness not visit as other respiratory illness may be circulating.

↑**AIII**

F. Patient Care Equipment (Cleaning, Disinfection and Sterilization)

Sterilization and high-level disinfection requires supervision by a trained professional, dedicated space and specialized equipment. Items requiring sterilization or high level disinfection should be disposable or managed by the "parent" organization.

The appropriate cleaning, disinfection sterilization, storage and handling of patient care equipment is an obligatory component of health care and cannot be overemphasized. Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient. The following recommendations apply in all circumstances. Please refer to the Glossary for definition of terms.

Recommendations

1. Process

    a. Reprocessing equipment (i.e., disinfection or sterilization) is **not** recommended but, if considered, the "parent" organization must provide a specially trained, knowledgeable person to be responsible for the processes. Where there is no "parent" organization to plan or operate the Temporary Influenza Hospital, it is expected that another organization would assume this role. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and safe handling/transport of contaminated equipment.

    AIII

    b. Procedures should be established for assigning responsibility and accountability for routine cleaning of all patient care equipment[109,111,112,134].

    BIII

    c. Reuse of single use items in this setting is strongly discouraged.

    AII

2. Cleaning

    a. Items that are shared, should be cleaned between patients. A hospital grade germicide should be used for routine cleaning. Please see Appendix V, Table A *Cleaning Procedures for Common Items.*

    BIII

    b. Reuseable items must be thoroughly cleaned before disinfection or sterilization[135-137]. Items should be washed with hot soapy water, using an enzymatic cleaner.

    AII

    c. Equipment that is visibly soiled should be cleaned promptly.

    BIII

    d. Soiled patient care equipment should be handled in a manner that prevents exposure of skin and mucous membranes and contamination of clothing and the environment.

    BIII

    e. Commodes and toilets should be cleaned twice daily and when soiled. Ideally, bedpans should be reserved for use by a single patient, labeled appropriately or cleaned between uses.

    BIII

    f. Personal care supplies (e.g., lotion, creams, soaps) should not be shared between patients.

    BIII

3. Disinfection
    a. Reuseable items must be adequately rinsed and dried before disinfection or sterilization and dried before storage.

    ↑AII

    b. Manufacturers' written recommendations for the use of chemical disinfectant should be followed.
    c. Only disinfectants with a DIN (disinfectants approved for use in Canada) should be used.
    d. Respiratory therapy and anesthesia equipment require, at a minimum, high level disinfection[113-116].

    ↑AIII

4. Sterilization
    a. Critical items must be sterile[135].

    ↑AIII

    b. The steam sterilization process must be monitored by biologic indicator testing at least daily[137].

    ↑AIII

    c. The sterilization process must be monitored at each cycle by mechanical and chemical indicators[118]. Each pack must contain a chemical indicator[137].

    ↑AIII

    d. A procedure for the recall of items processed from a load that contained a positive biological indicator should be established and followed[137].

    ↑AIII

    e. Flash sterilization is **not** recommended.

    ↑AIII

    f. Microwave ovens, glass bead sterilizers and boiling for sterilization should not be used[138].

    ↑AIII

5. Storage
    a. After reprocessing, sterility must be maintained until point of use[118].

    ↑AIII

    b. Sterile items must be maintained sterile until use[118-120].

    ↑AII

    c. Sterile and clean supplies should be stored in a clean dry area.

    ↑AII

    d. Clean and sterile supplies should not be hoarded.

    ↑AII

    e. Soiled equipment should be kept physically separate from clean/sterile supplies and equipment.

    ↑AII

G. *Environmental Control (Housekeeping, Laundry and Waste)*

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14].

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

1. Housekeeping

Appropriate housekeeping is a required component of health care and cannot be overemphasized. The following recommendations apply in all circumstances. Please refer to the glossary for a definition of terms.

Recommendations

a. Process

i. "Parent" organizations must provide a specially trained, knowledgeable person responsible for housekeeping and the policies for cleaning schedules and methods.

When there is no "parent" organization to plan or operate the triage settings, it is expected another organization would assume this role.

↑**AIII**

ii. Products and procedures should be aligned with, or approved by, the "parent" organization

↑**AIII**

iii. An education program for those providing housekeeping services should help them to understand the effective methods of cleaning and the importance of their work.

↑**BIII**

iv. Housekeepers, as with other health care workers, should be offered immunization against hepatitis B[6,9].

↑**AII**

b. Cleaning

i. Daily cleaning of environmental surfaces and noncritical patient care items should be sufficient to keep surfaces clean and dust free[121-123]. Surfaces that are frequently touched (i.e., contaminated) by the hands of health care providers and patients/residents/clients, such as surfaces of medical equipment and knobs for adjustment or opening, should be cleaned twice daily or when known to be contaminated.

↑**BIII**

ii. Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.

↑**AII**

iii. Damp rather than dry dusting or sweeping should be performed, whenever possible, in order not to generate dust particles. Any dry cleaning should be done carefully with a chemically treated dry mop or vacuum cleaner (equipped with exhaust filter) rather than a broom. (Note: carpets are discouraged in this setting).

BIII

iv. Vacuum cleaners, equipped with exhaust filters, should be used on carpeted areas. Expelled air from vacuum cleaners should be diffused so that it does not aerosolize dust from uncleaned surfaces.

BIII

v. During wet cleaning, cleaning solutions and the tools with which they are applied soon become contaminated. Therefore, a routine should be adopted that does not redistribute microorganisms. This may be accomplished by cleaning less heavily contaminated areas first and also by changing cleaning solutions and cloth/mop heads frequently.

BIII

vi. Wet mopping is most commonly done with a double-bucket technique, i.e., one bucket for soil, one for rinsing. This technique extends the life of the solution because fewer changes are required. When a single bucket is used, the solution must be changed more frequently because of increased soil.

BIII

vii. Tools used for cleaning and disinfecting must be cleaned and dried between uses.

BIII

viii. Mop heads should be laundered daily. All washed mop heads must be dried thoroughly before storage[121] or reuse.

BIII

c. Cleaning agents

i. In most areas, detergents are acceptable for surface cleaning. Please refer to Appendix V, Table A, Cleaning Procedures for Common Items.

ii. Cleaning and disinfecting agents must be mixed and used according to manufacturers' recommendations.

AIII

iii. Protective apparatus: Household utility gloves should be worn during cleaning and disinfecting procedures. Manufacturers' directions should be followed for product use to ensure safe handling practices.

BIII

iv. Disinfectant fogging (spraying disinfectant in a closed area) is not necessary and should not be done[139].

AIII

d. Blood Spills[9]

i. Appropriate personal protective equipment should be worn for cleaning up a blood spill. Gloves should be worn during the cleaning and disinfecting procedures. Care must be taken to avoid splashing or generating aerosols during the clean up. If the possibility of splashing exists, the worker should wear a face shield or safety glasses/mask and gown. For large blood spills, overalls, gowns or aprons as well as boots or protective shoe covers should be worn. Personal protective equipment should be changed if torn or soiled, and always removed before leaving the location of the spill, then hands should be washed immediately.

BIII

ii. The blood spill area must be cleaned of obvious organic material before applying a disinfectant, as hypochlorites and other disinfectants are substantially inactivated by blood and other materials[9,140,141]. Excess blood and fluid capable of transmitting infection should be removed with disposable towels. Discard the towels in a plastic-lined waste receptacle.

AII

iii. After cleaning, areas should be disinfected with a low level chemical disinfectant (e.g., chemical germicides approved for use as 'hospital disinfectants', such as quaternary ammonium compounds) or sodium hypochlorite (household bleach). Concentrations ranging from approximately 500 ppm (1:100 dilution of household bleach) sodium hypochlorite to 5000 ppm (1:10 dilution of household bleach) are effective, depending on the amount of organic material (e.g., blood or mucous) present on the surface to be cleaned and disinfected. Please refer to Appendix V, Table B, Directions for Preparing Using of Chlorine-based Disinfectants.

Commercially-available chemical disinfectants may be more compatible with certain medical devices that might be corroded by repeated exposure to sodium hypochlorite, especially the 1:10 dilution[62,140,142]. Manufacturers' recommendations for dilutions and temperatures of chemical disinfectants approved for use as hospital disinfectants must be followed. Sodium hypochlorite or chemical germicide should be left on surface for at least 10 minutes.

AII

iv. The treated area should then be wiped with paper towels soaked in tap water. Allow the area to dry. The towels should be discarded in a plastic lined waste receptacle.

AIII

v. Hands must be thoroughly washed after gloves are removed.

AII

2. Laundry

Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required. The following recommendations apply in all circumstances.

Recommendations

a. Process

i. Parent organizations must provide a specially trained, knowledgeable person responsible for laundry. Where there is no "parent" organization to plan or operate the triage settings, it is expected that another organization would assume this role.

AIII

b. Collection and handling

  i. There is no special handling required for linen from patients suspected of having or confirmed to have influenza.

AII

  ii. All soiled linen should be handled in the same way for all patients.

AII

  iii. Linen should be handled with a minimum of agitation and shaking[126,127,143].

BIII

  iv. Sorting and rinsing of linen should not occur in patient care areas.

BIII

  v. Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle[126,127]. Large amounts of solid soil, feces or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.

BIII

c. Bagging and containment

  i. Soiled linen should be bagged at the site of collection[126,127,144].

CIII

  ii. To prevent contamination or soaking through, a single, leakproof bag[126,144,145] or a single cloth bag can be used[143]. A second outer bag is only required to contain a leaking inner bag[126,127,145,146].

BII

  iii. Use of water soluble bags is not recommended. These offer no benefit for infection control and add additional costs[126,127].

BIII

  iv. Laundry carts or hampers to collect or transport soiled linen do not need to be covered[127] unless odor control is a factor.

BIII

  v. Bags should be tied securely and not over-filled when transported either by chute or cart[126].

BIII

  vi. Linen bags should be washed after each use and can be washed in the same cycle as the linen contained in them[127].

BIII

d. Transport

  i. When linen is commercially laundered, adequate separation of clean and dirty laundry in the truck is essential to ensure that there is no opportunity for mixing clean and dirty linen.

BIII

  ii. Linen transported by cart should be moved in such a way that the risk of cross contamination is minimized[121,127].

BIII

iii. Separate carts should be used for dirty and clean linens. Carts used to transport soiled linens should be cleaned after each use with a cleaning product specified for use in the health care setting.

↑**BIII**

iv. Clean linen should be transported and stored in a manner that prevents its contamination and ensures its cleanliness[121,126,127].

↑**BIII**

e. Washing and Drying

i. If low temperature water (less than 71.0° C) is used for laundry cycles, chemicals suitable for low temperature washing at the appropriate concentration should be used.

↑**BIII**

ii. High temperature washes (more than 71.1° C) are necessary if cold water detergents are not used[127].

↑**BIII**

iii. To achieve a level of at least 100 ppm of residual chlorine with household bleach, 2 mL of household bleach should be added for every litre of water. See Appendix V, Table B, Directions for Preparing and Using Chlorine-based Disinfectants.

↑**BIII**

iv. In institutional laundry areas, the addition of a mild acidic "souring" agent neutralized the alkalinity from the fabric, water and detergent. This shift in pH, from approximately 12 to 5, may inactivate any remaining bacteria and reduce the potential for skin irritation[127].

↑**BIII**

f. Protection of laundry workers

i. Workers should protect themselves from potential cross infection from soiled linen by wearing appropriate protective equipment, such as gloves, gowns or aprons, when handling soiled linen. Reuseable gloves should be washed after use, allowed to hang to dry, and discarded if punctured or torn.

↑**BIII**

ii. Hand washing facilities should be readily available.

↑**BII**

iii. Personnel should wash their hands whenever gloves are changed or removed[3,5,9].

↑**BII**

iv. Staff in care areas need to be aware of sharps when placing soiled linen in bags. Workers are at risk from contaminated sharps, instruments or broken glass that may inadvertently be contained with linen in the laundry bags[126,127].

↑**BIII**

v. Laundry workers, as other health care workers, should be offered immunization against hepatitis B[6,9].

↑**AII**

vi. All caregivers and laundry workers should be trained in procedures for handling soiled linen[9].

BIII

3. Waste

Waste generated in temporary hospitals is no more hazardous than household waste. Only sharps contaminated with body fluids[9] require special handling and treatment. Appropriate waste handling is a required component of health care and cannot be overemphasized. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required. The following recommendations apply in all circumstances.

See Glossary for terms.

Recommendations

a. Process

i. Parent organizations must provide a specially trained, knowledgeable person responsible for waste. Where there is no "parent" organization to plan or operate the triage settings, it is expected that another organization would assume this role.

AIII

ii. Written policies and procedures to promote the safety of waste handlers should be established.

BIII

iii. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required.

AII

b. Regulations

i. Local environmental and health regulations should be followed when planning and implementing treatment and disposal policies for biologic waste.

BIII

ii. Specific categories of biologic waste may be disposed of in a properly managed landfill provided that there are procedures in place to protect workers and the public from contact with the waste.

BIII

iii. Medical waste, (e.g., gloves, sponges, dressings, or surgical drapes that are soiled or soaked with blood or secretions) may be contained in impervious waste-holding bags or double bags and may be disposed of in a landfill[147-149].

BIII

iv. If local regulations permit it, blood, suctioned fluids, excretions and secretions may be disposed of in a sanitary sewer.

BIII

v. Used needles and other sharp instruments should be handled with care to avoid injuries during disposal. Used sharp items should be disposed of immediately in designated puncture-resistant containers located in the area where the items were used[9,125].

↑AIII

vi. A biohazard symbol is required on all sharp containers. Provincial or territorial regulations regarding colour coding must be followed.

↑BIII

vii. The transportation of infectious waste must comply with the *Transportation of Dangerous Goods Act and Regulation,* Transport Canada[150].

viii. Infectious waste must be stored in a designated location with access limited to authorized personnel. Refrigerated space should be provided for lockable, closed storage of laboratory waste that will be disposed of off site[151]. Provincial/territorial regulations for specific storage requirements must be followed.

↑BIII

ix. As the waste generator is accountable for waste disposal, ensure careful selection of waste hauling, treatment and disposal firms so all stages of transportation and disposal are carried out in a safe and legal manner[151].

↑BIII

c. Waste Handlers

i. Waste handlers should wear protective apparatus appropriate to the risks involved, (e.g., protective footwear and heavy work gloves).

↑BIII

ii. Waste handlers, as with other HCWs, should be offered hepatitis B immunization[6,9].

↑AII

H. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

1. Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above during the care of the deceased body, is required.

↑AIII

2. The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until pick up by funeral services.

↑AIII

Appendix I.
Guideline Rating System

Health Canada Guideline Evidence-Based Rating System

Three categories rank the strength of evidence for a recommendation and three grades describe the quality of supportive studies for that recommendation. This format uses an evidence-based approach through the critical scrutiny of evidence from clinical trials research, well designed experimental and observational studies, and places less emphasis on descriptive studies, clinical intuition, and recalled experiences. The rating scale is outlined in the table below.

Table: Strength and Quality of Evidence for Recommendations

Categories for strength of each recommendation	
CATEGORY	DEFINITION
A	Good evidence to support a recommendation for or against use
B	Moderate evidence to support a recommendation for or against use
C	Insufficient evidence to support a recommendation for or against use
Categories for quality of evidence	
GRADE	DEFINITION
I	Evidence from at least one properly randomized, controlled trial
II	Evidence from at least one well-designed clinical trial without randomization; from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series; or from dramatic results in uncontrolled experiments
III	Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees

Note: If established regulations are quoted in a document, no ratings are assigned to these legislative requirements

Appendix II.
World Health Organization (WHO) Definition of Preparedness Levels

Phase 0: Interpandemic activities

No indication of any new virus type has been reported.

Phase 0: Preparedness Level 1

New influenza strain in a human case.

No clear evidence of spread or outbreak activity.

Phase 0: Preparedness Level 2

Human infection confirmed.

Two or more human infections have occurred with a new virus sub-type, but the ability of the virus to readily spread from person-to-person and cause multiple outbreaks of disease leading to epidemics remains questionable.

Phase 0: Preparedness Level 3

Human transmission of the new virus sub-type has been confirmed through clear evidence of person-to-person spread in the general population, such as secondary cases resulting from contact with an index case, with at least one outbreak lasting over a minimum two week period in one country.

Phase 1: Confirmation of onset of pandemic

The pandemic will be declared when the new virus sub-type has been shown to cause several outbreaks in at least one country, and to have spread to other countries with consistent disease patterns indicating that serious morbidity and mortality is likely in at least one segment of the population.

Phase 2: Regional and multi-regional epidemics

Outbreaks and epidemics are occurring in multiple countries, and spreading region by region across the world.

Phase 3: End of the first pandemic wave

The increase in outbreak activity in the initially affected countries or regions has stopped or reversed, but outbreaks and epidemics of the new virus are still occurring elsewhere.

Phase 4: **Second or later waves of the pandemic**

Based on past experiences, at least a second severe wave of outbreaks caused by the new virus would be expected to occur within 3-9 months of the initial epidemic in many countries.

Phase 5: **End of the pandemic (back to Interpandemic phase; Phase 0)**

WHO will report when the Pandemic Period has ended, which is likely to be after 2-3 years. The indications for this will be that indices of influenza activity have returned to essentially normal inter-pandemic levels and that immunity to the new virus subtype is widespread in the general population.

Appendix III.
Hand Hygiene Procedures

A. How to Wash Hands (using non antimicrobial soap and antimicrobial soap)

Remove jewellery before hand wash procedure[152,153].
Rinse hands under warm running water. Rationale: This allows for suspension and washing away of the loosened microorganisms.
Lather with soap and, using friction, cover all surfaces of the hands and fingers. Rationale: The minimum duration for this step is 10 seconds[154]; more time may be required if hands are visibly soiled. For antimicrobial agents 3-5mL are required[152]. Frequently missed areas are thumbs, under nails, backs of fingers and hands.
Rinse under warm running water. Rationale: To wash off microorganisms and residual hand washing agent.
Dry hands thoroughly with a single-use towel. Drying achieves a further reduction in number of microorganisms[155,156]. Re-useable towels are avoided because of the potential for microbial contamination.
Turn off faucet without re-contaminating hands, e.g., use single use towel. Rationale: To avoid re-contaminating hands
Keep fingernails short[157,158] and do not use fingernail polish or artificial nails. Rationale: Chipped nail polish may increase bacterial load[158]. Artificial nails including wraps, acrylics or tips increase bacterial load[159-161]. Nail polish and artificial nails impede visualization of soil under nails.

Adapted from Health Canada Infection Control Guidelines: *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*, 1998[3].

B. Decontaminating Hands with an Alcohol-based Hand Rub

To decontaminate hands that are not visibly soiled* using an alcohol-based hand rub:

- Follow the manufacturer's recommendations on the volume of product to use;
- Apply product to palm of one hand and rub hands together, covering all surfaces of hands and finger, until hands are dry.

Note: * Hand wash if hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids by washing with either a non-antimicrobial soap and water or an antimicrobial soap and water as outlined in Appendix III A, How to Wash Hands.

(adapted from[1])

Appendix IV.
An Influenza-like Illness (ILI) Assessment Tool

An ILI assessment tool is to be used for immediate triage of patients or staff and for accommodation/cohort of patients prior to further OH or clinical management. This is not intended to be used as a clinical management tool. A clinical management assessment tool can be found in Annex G of the Canadian Pandemic Influenza Plan.

ILI Assessment Tool

Please check the following.

ILI in the general population is determined by the presence of 1, 2 and 3 and any of 4., a – c, which could be due to influenza virus:

___ (   ) 1. Acute onset of respiratory illness
___ (   ) 2. Fever (>38 C)*
___ (   ) 3. Cough
4. One or more of the following:
___ (   ) a. sore throat
___ (   ) b. arthralgia
___ (   ) c. myalgia or prostration

* May not be present in elderly people

Adapted from the ILI surveillance definition currently used by FluWatch for the 2002-2003 season[8].

Table A. Cleaning Procedures for Common Items

Surface/object	Procedure	Special considerations
Horizontal surfaces such as over bed tables, work counters, baby weigh scales, beds, cribs, mattresses, bedrails, call bells	1. Thorough regular cleaning 2. Cleaning when soiled 3. Cleaning between patients/ clients and after discharge	Special procedures sometimes called carbolizing are not necessary. Some environmental surfaces may require low level disinfection (e.g., in nurseries, pediatric settings, critical care, burn units, emergency rooms, operating rooms and bone marrow transplantation facilities).
Walls, blinds, curtains	Should be cleaned regularly with a detergent and as splashes/visible soil occur.	
Floors	1. Thorough regular cleaning 2. Cleaning when soiled 3. Cleaning between patients/ clients and after discharge. Damp mopping preferred	Detergent is adequate in most areas. Blood/body fluid spills should be cleaned up with disposable cloths followed by disinfection with a low level disinfectant.
Carpets/upholstery	Should be vacuumed regularly and shampooed as necessary.	
Toys	Should be regularly cleaned, disinfected with a low level disinfectant, thoroughly rinsed, and dried (between patients in acute care setting).	For pediatric settings, toys should be constructed of smooth, nonporous (i.e., not plush) materials to facilitate cleaning and decontamination. Do not use phenolics.
Toilets and commodes	1. Thorough regular cleaning 2. Cleaning when soiled 3. Clean between patients/ clients and after discharge. Use a low level disinfectant	These may be the source of enteric pathogens such as *C. difficile* and *Shigeila*.

Table B. Directions for Preparing and Using Chlorine-based Disinfectants[3]

Product	Intended use	Recommended dilution	Level of available chlorine
Household bleach (5% sodium hypochlorite solution with 50,000 ppm* available chlorine	Cleanup of blood spills	Use concentrations ranging from 1 part bleach to be mixed with 99 parts of tap water (1:100) or one part of bleach to be mixed with 9 parts of tap water (1:10), depending on the amount of organic material (e.g., blood or mucus) present on the surface to be cleaned and disinfected.	0.05% or 500 ppm 0.5% or 5,000 ppm
	To add to laundry water	One part (one 8 ounce cup) of bleach to be mixed with about 500 parts (28 gallons†) of tap water	0.01% or 100 ppm
	Surface cleaning Soaking of glassware or plastic items	One part (one 8 ounce cup) to be mixed with about 50 parts (2.8 gallons) of tap water	0.1% or 1,000 ppm
NaDCC (Sodium dichloroisocyanurate) powder with 60% available chlorine	Cleanup of blood spills	Dissolve 8.5 g in one litre of tap water	0.85% or 5,000 ppm
Chloramine-T powder with 25% available chlorine	Cleanup of blood spills	Dissolve 20 g in one litre of tap water	2.0% or 5,000 ppm

** Parts per million*

† Imperial gallon (4.5 litres)

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G Clinical Care Guidelines and Tools

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Chapter 1. Clinical Presentations of Influenza

Case definition

The spectrum of illness associated with influenza virus infections is wide, and ranges from asymptomatic infection to fatal disease, frequently associated with viral pneumonia. The previous experience of a population with antigenically related virus variants is a determinant of the severity of the disease. ***Therefore, with a pandemic strain, which would be new in the population, the anticipated clinical spectrum will be more severe***. Age and pre-existing co-morbidities (Table 1) also influence the outcome. Young children, elderly adults, pregnant women, and individuals with chronic diseases are at greatest risk of complicated influenza [77,151,78,71,79,80,1,183,158].

A general "Clinical Case Definition" for an influenza-like illness (ILI) and a review of recent literature describing the most common presentations and complications of influenza in adults and children are given below. This is a general definition and applies mainly to the clinical presentation of interpandemic influenza; it may need modification once the pandemic occurs[17,42,28,85,146,71,1,235,207,92].

Clinical Case Definition:

> When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38 C and when the onset of the clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinoorhea, malaise, rigors or chills, myalgia and headache, although non-specific, may also be present.

Confirmed cases of influenza are cases with laboratory confirmation (i.e., virus isolation from respiratory tract secretions, identification of viral antigens or nucleic acid in the respiratory tract, or a significant rise in serum antibodies) or clinical cases with an epidemiological link to a laboratory confirmed case[59,77,151].

For **surveillance** purposes, the Health Canada definition of ILI is:

- Acute onset of respiratory illness with fever (>38 C) and cough accompanied by one or more of the following: sore throat, arthralgia, myalgia or prostration, which could be due to an influenza virus (used by FluWatch for the 2000-2001 season[67].

For the 2001-2002 season, the Centers for Disease Control and Prevention (CDC) used the following case definition for **surveillance** in the USA (as of November 29, 2001):

- Temperature of >100°F (>37.8°C) and either cough or sore throat in the absence of a known cause[30].

Pathogenesis of influenza

The major site of infection by influenza viruses is the ciliated epithelial cell in the mucous layer of the respiratory tract. In the first few days after infection, necrosis of these cells and local edema occur, followed by infiltration by lymphocytes, plasma cells, histiocytes and polymorphonuclears. The incubation period may last 24h or up to 4-5 days (average of two days), varying with the infecting virus, size of the viral inoculum, and immunological status of the individual. The infectious period starts, typically, one day before the symptoms appear, and lasts approximately five days after the onset of clinical illness[77,151,1]. This may be longer for children and elderly patients. Infectious virus has been recovered from respiratory secretions 2-3 weeks after the onset of disease. Viral antigens have been detected in cells and secretions for several more days[21,183,135,70,29]. Asymptomatic carrier state, however, is not associated with influenza[183].

In uncomplicated influenza, repair starts 3-5 days after the beginning of symptoms; however, restoration of ciliated cells and mucous production are not restored until up to 15 days. If there is secondary bacterial infection, the inflammatory destruction of the basal cell layer is greater and the regeneration of the epithelia may take much longer[210,151].

Fatal cases of viral pneumonia have varying degrees of interstitial cellular infiltrate, alveolar edema, and hyalin membrane deposition. The virus also infects polymorphonuclear and mononuclear leucocytes, depressing their response to chemotactic stimuli and decreasing cellular functions (phagocytosis, proliferation, costimulation, etc.). This, together with the necrosis and desquamation of the ciliated epithelial cells and the general distortion in mucus secretion, favours the development of bacterial pneumonia (or combined viral/bacterial pneumonia). Bacterial sinusitis and/or otitis media following influenza apparently result through similar mechanisms[151,77,210].

The virus replicates throughout the respiratory tract and it is possible to recover infectious particles from the upper and lower tract of individuals naturally or experimentally infected with influenza[151,77,210]. The hemagglutinin of the virus (HA) binds to the receptor molecules of cells, while the neuraminidase (NA) facilitates release of viral particles, liquefying the mucous secretions to promote access to new cells. At 1-2 days post infection, there is a peak in virus replication, which decreases over the next 5-10 days. There is a direct correlation between virus shedding and severity of disease, with higher titres and longer shedding, in severely ill individuals (up to 10^9 in severe influenza pneumonia[77,109]. Children and elderly patients generally have high titres of virus in their secretions, and continue shedding viruses for longer periods of time (8-13 days); promoting transmission[21,183,135,232]. In some patients, viral antigens may be detected in secretions and cells for prolonged periods, even when virus isolation is negative[151].

Influenza viruses have been isolated from blood only on rare occasions[153,118,179,178,179,176,151]; however, it is possible to isolate the virus from the muscles of patients with rhabdomyositis and from other extrapulmonary sites in individuals with fatal influenza. Foetal transmission is also possible[77,117,189,151]. It has been suggested that the virus may circulate in infected lymphocytes[227,77].

An increase in the number of leukocytes in blood is usually detected between days 1 and 3 after influenza infection, with a rise in neutrophils and a fall in lymphocytes. This lymphopenia includes T cells, B cells, and null cells[48,128]. A recently described protein, encoded by some influenza A virus, is a candidate for inducing apoptosis of human monocytic cells with the CD8+T cell phenotype, and may be related to the high lethality of some strains[33].

The severity of clinical disease during an influenza pandemic is determined by the immunological status of the population and viral factors. For example, the cleavage of the HA molecule in Influenza A, is critical in determining the virulence of two avian strains: the H5 strain, which is very virulent, and the H7 strain, which is almost avirulent. In the less virulent strains, proteases able to cleave the HA were present only in the respiratory and gastrointestinal tracts of poultry, thus limiting virus replication to these areas. Changes in the amino acid composition of the HA (as seen in H5 virions), rendered this protein cleavable by more ubiquitous enzymes and allowed the virions to replicate systemically, causing a generalized, fatal disease[210]. A similar mechanism, i.e., high cleavability of the HA glycoprotein, has been suggested to explain the high human-lethality of H5N1 influenza A infections in Hong-Kong in 1997[95]. Recently, a new viral protein, PB1-F2, was described in some avian influenza virus; this protein may be involved in the ability of avian H5N1 and H9N2 influenza A virus to infect humans and cause disease[190,33].

Following infection by influenza virus, antibodies are produced against four major components of the virion: HA (hemagglutinin), NA (neuraminidase), NP (the predominant protein of the nucleocapsid), and M protein (matrix protein). Nevertheless, only antibodies against HA and NA have been linked with resistance to infection by influenza[151]. Anti-HA antibodies are the primary neutralizing antibodies and participate in complement-mediated lysis of infected cells, aggregation of virions, and cell cytotoxicity. Anti-NA, on the other hand, reduce the number of new infectious units released from infected cells, and may reduce the severity of disease and even prevent clinical illness if present in high titre.

In nasal secretions, the neutralizing antibodies are predominantly IgA, but IgM and IgG are also secreted locally. Local antibodies are associated with resistance to infection and can be detected for 3-5 months after illness. There is also local memory.

B cells producing specific IgG, IgA, and IgM can be detected in peripheral blood of normal individuals and of subjects with influenza infection. The level of anti HA and anti NA antibodies in blood has been associated with resistance to infection and with recovery from the disease[41,151]. A protective effect for maternally transmitted antibodies can be inferred from the relation existing between age in months of infants and symptomatic influenza, and is supported by studies measuring levels of maternal antibodies in cord serum[174].

The replication of influenza viruses in a new host activates a cascade of inflammatory cytokines, which is followed by fever and by the symptoms of the disease. Nasal lavage specimens from humans infected with influenza A contain interleukin-6 (IL-6), tumour necrosis factor- (TNF-), gamma interferon (IFN-), interleukin-10, monocyte chemotactic protein 1, and macrophage inflammatory proteins 1 and 1- . Studies performed in volunteers with experimental infection and in patients with influenza A of less than 36 h of duration, showed that the levels of IL-6 and of TNF- in upper respiratory secretions correlate directly with virus replication, fever, respiratory and systemic symptoms, and with an increase in respiratory secretions. High levels of IFN- , on the other hand, were associated with an early decrease in viral titre[109,97]. IL-6 is a potent pyrogen that induces fever, chills and fatigue when administered to humans[220], it is also involved in the initiation of the immune response to the virus[109]. TNF- , on the other hand, correlates with fever but not with symptoms, and recent experiments demonstrated that it has potent anti-influenza activity[109,187]. Very high levels of both cytokines, IL-6 and TNF- , were also found in serum and cerebrospinal fluid (CSF) of patients with influenza-associated encephalopathy. In a study done in Japan, Il-6 levels were used for diagnosis and prognosis of the course of the disease: the lower the level of IL-6, the milder the CNS participation. Values higher than 6,000 pg/mL were found in children with brain stem dysfunction, about 150 pg/mL were present in children without brain stem dysfunction and less than 80 pg/mL in controls; children with values higher than 15,000 pg/mL did not survive[2].

Human monocytes are highly susceptible to influenza A virus and die 24-48 hours after infection. Although the release of complete virus particles from these cells is very low, they secrete several pro-inflammatory cytokines (TNF- , IL-1 , IL-6, interferon /) and chemotactic factors responsible for the mononuclear infiltrate characteristic of influenza infected tissues[115]. In addition, secondary trigger signals, such as very small amounts of LPS (or other secondary bacterial products) could cause an excessive increase in cytokine production and secretion by the monocytes. This priming-triggering effect may be responsible for the severe complications of secondary bacterial super-infections observed after influenza A infections[115].

It has been shown that H5N1 influenza viruses infecting humans in 1997 can avoid the antiviral activity exerted by TNF- and by the interferons[186]. Post-mortem reports from two patients suggested that virus replication in the respiratory tract caused an increase in the level of inflammatory cytokines, resulting in a reactive hemophagocytic syndrome that was the main cause of death. The authors propose that the synthesis of high levels of cytokines was stimulated after the virus could escape their antiviral effect and continued to replicate[186].

1.1 Most Common Clinical Presentations

1.1.1 Adults

The typical clinical presentation of uncomplicated influenza is tracheobronchitis with some small airway involvement. The onset of disease is usually abrupt: headache, chills and dry cough, followed by fever of 38-40°C that may peak as high as 41 C within the first 24 hours, together with myalgia, malaise, and anorexia. Physical signs include hot and moist skin, flushed face, injected eyes and clear nasal discharge. Some patients also have nasal obstruction, sneezing, pharyngeal inflammation, excessive tearing and mild cervical adenopathy[77,151,1,17,42,28,183,26,147,27,146]. Chest x-rays and auscultatory findings are usually normal, with occasional crackles and wheeze. In uncomplicated influenza, the airflow in large airways remains relatively normal. There is, however, a transient increase in bronchial reactivity and some temporary alterations in gas exchanges in small peripheral airways[151,133,104]. Bronchial hyper reactivity may continue well beyond the clinical illness, even in subjects without a history of bronchospasm[133].

In uncomplicated influenza the fever usually declines after 2-3 days and disappears by the 6th day (median three days). Biphasic fever patterns are usually associated with secondary bacterial infections, but may be observed in some cases of uncomplicated influenza. While the temperature declines, some respiratory symptoms, like cough and rhinorrhea, may increase, followed by the production of small amounts of, usually mucoid, sputum. Cough, weakness and fatigue can persist for 1 to 2 weeks and up to 6 weeks[77,151,1,17,42,28,183].

The disease is more severe in individuals younger than 5 years or older than 65 years[1,183,12,13,193,195,196]. The risk of lower respiratory tract infection (LRTI) is much higher in young children, smokers, geriatric patients and persons with underlying cardio-respiratory disorders (most frequently asthma in younger patients and chronic bronchitis and emphysema in older persons[78,71,119,42,56,135,158,11,57,112]. Viral pneumonitis is most frequent in young children, while bacterial superinfection is common in the elderly. *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Staphylococcus aureus* are the most common agents of secondary bacterial pneumonia. Gram-negative bacteria, *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* are also found in some patients[77,78,80,130,140,16].

Different strains of influenza may be associated with different symptoms or severity of disease[71,42,28]. Two influenza A subtypes: A (H1N1) and A (H3N2), and one influenza B strain, have been circulating worldwide in the last decade (with minor strain variations) and are associated with yearly epidemics. Influenza A (H3N2) is frequently associated with more severe clinical diseases and pneumonia[71,76,135,42,158,11,196,122]. It affects young and old equally, and accounts for up to 28% of acute cardiopulmonary hospitalizations of older persons[135,11]. Focal outbreaks in nursing homes are usually caused by A (H3N2) viruses[56,102,9]. Influenza A (H1N1), on the other hand, infects children every year but has only a minor impact in the elderly, and influenza B preferentially causes disease in children, with frequent gastrointestinal symptoms[135,11,26,69,195].

During the 2001-2002 season, a new subtype, influenza A (H1N2) was isolated in several countries. These new viruses resulted from gene reassortment between the circulating A (H1N1) and A (H3N2) viruses. Because both viral proteins were similar to the homologous antigens in the circulating strains and in the vaccine strains, the new viruses did not cause more severe illness or higher influenza activity in this season[32].

Human infections by influenza A (H5N1) were first detected in Hong Kong in 1997, where six of 18 patients admitted to hospital died[42,35,235]. These infections were characterized by a high case-fatality rate, a high incidence of gastrointestinal symptoms in adults, and a high rate of pulmonary, renal, hepatic and haematologic complications in patients without previously identified high risk conditions[42,235,95].

Influenza C viruses are usually associated with mild illnesses, which are sometimes asymptomatic. For that reason, virus isolation has not been performed regularly, and the spectrum of diseases produced by influenza C is not well characterized. Studies in Japan found temperatures of 38-40 C for 2-3 days in young children, who also had coryza and cough lasting for a period of 2 weeks in up to 50% of the patients[183,114]. Adults had similar but milder symptoms, and complained mainly of malaise, sore throat and headache. In another study, however, the symptoms reported in young adults were as severe as those associated with influenza A infection and lasted longer[51].

Only influenza A has been associated with pandemics, however interpandemic epidemics can be attributed to both A and B viruses[42,75,151].

Although almost all deaths related to annual epidemics of influenza occur in the elderly or in the very young, and approximately 90% of excess deaths during epidemics occur among persons older than 65 years[12,122], in pandemic periods, adults younger than 65 years have accounted for 50% of the deaths[193]. For example, nearly half of the influenza-related deaths during the 1918-1919 influenza A (H1N1) pandemic occurred in the 20-40 years olds. Most of the deaths during the 1968-1969 influenza A (H3N2) pandemic occurred in adults 45-65 years old (half of them were previously healthy and without any detectable co-morbid illness[192,193], and a large proportion of influenza-related deaths during the 1957-1958 influenza A (H2N2) pandemic occurred among persons younger than 65 years[85,193,195,122,196].

1.1.2 Children

Children have the highest rates attack rates of influenza, and are the major disseminators of the virus[192]. In a regular "influenza season", influenza infections are the most important causes of consultation in outpatient clinics and account for one half of lower respiratory tract infections that result in hospitalizations of children[80,183]. During most influenza epidemics, influenza viruses supplant all other major respiratory viruses as causes for consultation for respiratory infection in children[80,183,205].

The highest rate of influenza-related serious illness in children occurs in the 6-12 months old age group, after the waning of maternal antibodies[183,192,82]. Although uncomplicated influenza in children may be similar to the disease in adults, there are some age related differences in toddlers and infants[77,151,1,147]:

1) Young children usually develop higher temperatures (over 39.5 C) and may have febrile seizures[151,80,233,21,42].
2) Unexplained fever can be the only manifestation of the disease in neonates and infants[151,80,233,21,119,170,29,110,7,18].
3) Influenza viruses are an important cause of laryngotracheobronchitis (croup), pneumonia and pharyngitis-bronchitis in young children. Both types, A and B, are significant causes of low respiratory tract infections[151,78,80,76,233,21,119,170,183].
4) Gastrointestinal manifestations, such as nausea, vomiting, diarrhoea and abdominal pain, are found in 40-50% of patients, with an inverse relation to age (mainly in 3 years old or younger)[151,170,42,183].
5) Otitis media and non-purulent conjunctivitis are more frequent in young ages[151,233,21,119,170,36,101].
6) A variety of central nervous system findings, including apnea, opisthotonos and seizures may appear in as many as 20% of the infants[183]. Children may also present with symptoms suggestive of meningitis, e.g., headache, vomiting, irritability and photophobia[77,171].
7) Myositis is a complication in young children, especially after infection with influenza B.

In children over 5 years and adolescents the most frequent symptoms are fever, cough, non-localized throbbing headache, chills, myalgia and sneezing. The fever is usually in the 38-40 C range and a second peak, without bacterial superinfection, may occur around the fourth day of illness. Backache, sore throat, conjunctival burning with watery eyes and epistaxis may be present, but gastrointestinal symptoms are infrequent. Chest auscultation is usually normal, but occasionally coarse breath sounds and crackles may be heard[183].

Respiratory illness caused by influenza is non-specific and difficult to distinguish from illness caused by other respiratory pathogens on the basis of symptoms alone. Many viral infections (respiratory syncytial virus [RSV], parainfluenza, adenovirus and rhinovirus), as well as other pyrexial diseases, can cause an illness that is clinically indistinguishable from influenza[183,135,219,191,161].

1.1.3 Special Populations: High-risk Conditions (Table 1)

The Canadian National Advisory Committee on Immunization (NACI) considers the following groups to be at "increased risk for complications from influenza"[152]:

- **Adults and children with chronic cardiac or pulmonary disorders (including bronchopulmonary dysplasia, cystic fibrosis and asthma) severe enough to require regular medical follow-up or hospital care**. Chronic cardiac and pulmonary disorders are by far the most important risk factors for influenza-related death.

- **People of any age who are residents of nursing homes and other chronic care facilities**. Such residents often have one or more of the medical conditions outlined in the first group. In addition, their institutional environment may promote spread of the disease.
- **People ≥ 65 years of age**. The risk of severe illness and death related to influenza is moderately increased in healthy people in this age group, but is not as great as in people with chronic underlying disease.
- **Adults and children with chronic conditions, such as diabetes mellitus and other metabolic diseases, cancer, immunodeficiency, immunosuppression (due to underlying disease and/or therapy), renal disease, anemia, and hemoglobinopathy**. Immunosuppressed patients are at increased risk for influenza infection, morbidity and mortality. Influenza may result in significant morbidity and mortality among HIV-infected individuals.
- **Children and adolescents (6 months to 18 years of age) with conditions treated for long periods with acetylsalicylic acid (e.g., Kawasaki disease, juvenile rheumatoid arthritis, acute rheumatic fever, and others**[59]. This therapy might increase the risk of Reye's syndrome after influenza.

The Advisory Committee on Immunization Practices (ACIP) and the CDC in the USA also include as "persons most susceptible to complications or death from influenza":

- **"Women who will be in the second or third trimester of pregnancy during the influenza season (fall or winter)**[1,29].
- **"Children younger than 2 years of age"**[29].
- **The CDC also include people ≥ 50 year old rather than ≥ recommended by NACI**[29]

1.1.3.1 Pregnant women

Women with influenza infection in their second and third trimesters of pregnancy are at increased risk of hospitalization for cardio-respiratory disorders[158,159,40]. This is probably due to the increase in heart rate, stroke volume, and oxygen consumption observed in these months, as well as to decreases in lung capacity and changes in immunological function[1,123,144,189,120]. Fatal influenza in pregnant women is characterized by the rapid development of cardiovascular and/or pulmonary insufficiency after several days of classical ILI. Fulminating viral or bacterial pneumonia may follow the initial viral infection[123,144,189,120]. In some cases the virus has been isolated from the offspring[86].

An increase in mortality of pregnant women, miscarriages, premature births and stillbirths was documented during the 1918-1919 and the 1957-1958 pandemics[42,94,231,86,144,224]. The reported mortality rate of pregnant women admitted to hospital with influenza in 1918 was 51.4% compared with 33.3% in hospitalized influenza patients from the general population[94,231]. Mortality rates among these hospitalized women were higher if pneumonia was present, with a peak at 61% during the last month of gestation[94,231,144,42]. Influenza deaths in pregnant women represented 50% of all deaths in women of childbearing age, and 10% of deaths from influenza during the epidemics of 1957-1958 in New York City and Minnesota[86,72]. These women experienced illness lasting 1-10 days and died from respiratory insufficiency associated with pulmonary edema and pneumonia (bacterial and/or viral). A review of 30 deaths from pneumonia and influenza in pregnant women in Massachusetts between 1954 and 1974 showed more fatalities towards the last trimester and early puerperium (no deaths occurred in the first trimester), and the risk was higher with increasing maternal age[189]. Only four of the thirty women who died had underlying medical pulmonary or cardiac conditions.

During 17 inter-pandemic influenza seasons[159] the relative risk for hospitalization for selected cardio-respiratory conditions among pregnant women increased more than three times between weeks 14-20 and weeks 37-42 of gestation. The respective increased rates of hospitalization were 1.4 and 4.7 compared with women who were 1-6 months postpartum. Women in their third trimester of pregnancy were hospitalized at a rate comparable with that of non-pregnant women who had high-risk medical conditions (i.e., 250/100,000 pregnant women[159].

1.1.3.2 Elderly adults in long-term facilities

Excess hospitalization and death, and functional decline, occur in elderly individuals after epidemics of influenza. Community dwelling adults 65 years of age or older, and particularly frail elderly in long-term care institutions, are at increased risk of influenza complications[56,10,65,8,58,57,13,12,102,196].

Although influenza pneumonia and bacterial pneumonia following influenza are considered the main causes of influenza related hospitalization in the elderly, many influenza related hospitalizations are attributed to the exacerbation of chronic obstructive pulmonary disease or congestive heart failure following the viral infection[56,11].

The symptoms and signs seen in older adults are similar to those in younger individuals, but most cases are characterized by the presence of dyspnea, wheezing, sputum production, and temperatures of 38 C[56,207]. In addition, any unexplained acute deterioration in health status associated with fever, may be a manifestation of influenza infection in elderly individuals[11].

Influenza-like illness in older adults can also be caused by other viruses, mainly RSV or parainfluenza. RSV infections are an important cause of hospitalization and death of elderly individuals and it is impossible to distinguish between RSV and influenza on the basis of clinical manifestations alone[56,135,11,65,57,219].

1.1.4 Preexisting co-morbidity

1.1.4.1 Respiratory

Patients with chronic pulmonary conditions constitute the largest high-risk group, and the exacerbation of pulmonary diseases is the most frequent cause of hospitalization after influenza infection[77,151,78,1,79,158]. Among children and young adults (35 years), asthma is the most common co-morbidity requiring hospitalization for complicated influenza; emphysema and COPD predominate in individuals older than 45 years, and chronic bronchitis is observed in all ages[160,77,208,78,93]. Clinical studies have shown that influenza can trigger wheezing episodes in children with asthma[77,78]. A decrease in mucociliary clearance and phagocytic function (with the consequent reduction in local defences and local immunity) are frequently observed after influenza infection, and can be particularly severe in patients with chronic bronchitis or COPD[93,155].

1.1.4.2 Cardiovascular

In several population studies, cardiac disorders were the most common co-morbidity reported as a cause of death in influenza patients[78,158,13,93,162,154]. Deaths attributed to heart disease increase during the peak period of culture positive influenza, and precede by two weeks the peaks of pneumonia and influenza deaths[81].

Although pre-existing cardiovascular pathology is the most frequent cause of death in individuals older than 65 years, serious and sometimes fatal myocarditis may be a complication of influenza infection in otherwise healthy people[93,154].

1.1.4.3 Diabetes

Individuals 25 to 64 years old with diabetes were 3.7- 4.0 times more likely than those without diabetes to have pneumonia and influenza as a cause of death during influenza seasons[216]. In addition, individuals 65 years old or older with diabetes were twice as likely to die from pneumonia and influenza than their non-diabetic counterparts[216]. The elevated morbidity and mortality attributed to influenza in diabetics is expected, given the high risk of complications from respiratory infections in this group[158,74,216,124, 46,136]. Mechanisms of defence like phagocytosis and intracellular killing may be decreased in these patients[46]. *Staphylococcus aureus* and *Streptococcus pneumoniae* are the most frequent causes of bacterial infection. In addition, combinations of risk factors increase mortality rates exponentially, and diabetes is frequently associated with secondary cardiac and/or pulmonary diseases and with immune impairment[46]. Influenza infection may also provoke severe metabolic deterioration and ketoacidosis in diabetic patients, increasing the risks for complications of the diabetes[46,93,54].

1.1.4.4 Immunocompromised patients and patients with HIV

Influenza virus infections in immunosuppressed individuals and transplant recipients may be similar to the immunocompetent population. However, an extended clinical course and prolonged shedding of virus is more common in these patients, as well as more severe, life threatening, diseases[132,184,14,55,141,134,180,221].

Persons Infected with HIV: Influenza in AIDS patients is prolonged and more frequently associated with complications[184,14,55,175]. In a cohort of young and middle-aged women HIV infected, the risk for cardiopulmonary hospitalization was higher during influenza seasons than during the peri-influenza periods. This risk was even higher than for women with other high-risk conditions, like chronic heart and lung diseases[158]. Influenza-associated excess mortality was found for the adult and adolescent US population with AIDS during three influenza seasons. Among persons aged 25-54 years, the risk for influenza-related death was estimated at 9.4-14.6/10,000 persons with AIDS compared with 0.09-0.10/10,000 in the general population, and 6.4-7.0/10,000 for persons older than 65 years[132]. Deaths of AIDS patients due to pneumonia and influenza followed a seasonal pattern (and also a virus isolation pattern) with peaks in December-January, as in the general adult population. More than 90% of AIDS deaths occurred in the 25-54 years age group. The excess death rate in this age group was 81-155 times higher in AIDS patients than for the general US population in this age range, compared with the summer. These death rates are comparable and even higher than those seen in the general population 65 years or older[132]. Other studies reported that AIDS patients experience more severe respiratory symptoms and prolonged duration of illness with an increased risk of complications[184,14,55,141].

Immunocompromised children: No prospective studies of influenza in immunosuppressed children or in children with AIDS have been published. It is known, however, that children with HIV commonly have severe and persistent viral respiratory infections, including influenza. Children with cancer receiving immunosuppressive therapy had similar clinical manifestations to control populations, but the duration of the disease was longer[183,134,180]. In a study of transplant recipients, two of 19 patients developed severe infections, one child died and the second was febrile for 21 days with persistent virus isolation in respiratory secretions[183,134,180].

1.1.4.5 Other chronic illnesses, neoplastic diseases, renal diseases, etc.

Any patient suffering from a chronic disease that compromises the immune and/or metabolic homeostasis (other than the mentioned above) may develop complications of influenza. These include neoplastic diseases, renal diseases, hemoglobinopathies, some congenital diseases, and illnesses due to autoimmunity[183,61,116,134,64].

1.2 Complications of Influenza (Tables 2 and 3)

Influenza can exacerbate underlying medical conditions (e.g., pulmonary or cardiac disease), lead to secondary bacterial pneumonia, or cause primary viral pneumonia[77,151,1,13,193,195,196,194,81]. Influenza infection has also been associated with encephalopathy, transverse myelitis, Reye's syndrome, myositis, toxic shock syndrome, myocarditis, and pericarditis[1,159,193,195,196,194,81,192,93,167,154,176,53,52,105,68,138,37]. Hospitalization rates for children aged 0-4 years ranged from approximately 100/100,000 for those without high-risk conditions to 500/100,000 individuals, for those with high-risk conditions respectively[78,160]. Hospitalization rates are highest among children younger than 1 year of age and adults older than 65 years[1,160,106,96].

Since the influenza A (H3N2) virus pandemic in 1968, influenza-associated hospitalizations have been highest during epidemics caused by type A(H3N2) viruses[195,196]. Influenza-related deaths during influenza epidemics can result from pneumonia as well as from exacerbations of cardiopulmonary conditions and other chronic diseases. Older adults account for >90% of deaths attributed to pneumonia and influenza[1,193,10,65,8,58,57,13,12]. Sudden deaths have also been observed during influenza epidemics[167,68,171].

1.2.1 Lower respiratory tract complications

Involvement of the respiratory tract is found in 10% of cases in individuals 5-50 years old and up to 73% after 70 year of age[210]. Three different syndromes of severe pneumonia have been described as influenza-associated complications in adults and children (Table 3). Additional presentations of viral and/or bacterial respiratory tract infection are also seen frequently during interpandemic outbreaks of influenza (Table 2).

a) **Primary viral pneumonia:**

This is actually a manifestation of the disease at the more severe end of the spectrum[77,151,183]. It occurs mainly in high-risk patients, although 25% of reported cases are in young healthy individuals, and 13% in healthy pregnant women. Primary viral pneumonia develops abruptly following the onset of influenza illness and progresses within 6 to 24 hr to a severe pneumonia with tachypnea, tachycardia, cyanosis, high fever (>39-40 C) and hypotension. The illness may progress to hypoxemia and death in 1-4 days. Frothy haemoptysis, tachypnea and cyanosis are poor prognostic signs.

Clinical, physiological and laboratory findings are not specific. Bilateral crepitant inspiratory crackles are frequent, as well as mottled densities and diffuse symmetrical interstitial infiltrates or areas of consolidation in the X-rays. The presence of cavitations or pleural infiltrates, suggests bacterial superinfection. The pathology reveals interstitial pneumonitis with severe hyperaemia, broadening of the walls of the alveoli with edema and exudates, intraalveolar haemorrhage and hyaline membranes, infiltration predominantly mononuclear, and capillary dilatation and thrombosis. Autopsy specimens usually have high virus titres. Nonfatal cases recover 5 to16 days after the onset of pneumonia, but require up to 4 months for resolution of the x-rays and residual lung damage is frequent[77,151,183].

Milder forms of influenza viral pneumonia involving only one lobe or segment have been described (Table 3). This "localized viral pneumonia" is less serious than the primary pneumonia described above and is frequently confused with pneumonia due to *Mycoplasma pneumoniae*[210].

b) **Combined viral-bacterial pneumonia**

This is three times more common than viral pneumonia, from which it may be clinically indistinguishable. The symptoms usually appear later; chest x-rays frequently show cavitations or pleural effusion. The diagnosis requires isolation of pathogenic bacteria in the sputum or pleural fluid and the radiological findings. The most frequent agents are: Streptococcus pneumoniae, *Staphylococcus aureus* or *Haemophilus influenzae*. Mortality of viral or combined viral-bacterial pneumonia is ~10-12%. Some strains of Staphylococcus aureus have a synergistic effect with the virus and increased pathogenicity[77,151]. Decreased leukocyte chemotaxis and tracheobronchial clearance increases the severity of bacterial infections and may lead to the development of fatal pneumonia and toxic shock syndrome (TSS) in healthy young individuals.

c) **Secondary bacterial pneumonia**

After initial improvement from viral infection (~ 4 days), the patient develops chills, pleuritic chest pain, increased productive cough and purulent or bloody sputum. Chest x-rays reveal local areas of consolidation and leukocytosis is common. The fatality rate is about 7%. These patients are more often elderly and have chronic diseases (i.e., pulmonary, cardiac, metabolic, etc.). Gram staining and culture of sputum usually show a bacterial pathogen, most frequently *Streptococcus pneumoniae*, or *Haemophilus influenzae*[84,77,151,210].

d) **Other pulmonary complications**

In children, pneumonia is less common, although bronchitis or bronchiolitis may also occur as manifestations of influenza infection. It may be difficult to distinguish influenza from RSV or parainfluenza infections. Croup associated with influenza A seems to be more severe, but less frequent than after parainfluenza or RSV[210].

Acute exacerbation of chronic obstructive pulmonary disease is frequent seen with influenza infection and can result in permanent loss of function, mainly in elderly patients. Other diseases exacerbated by the virus are asthma and cystic fibrosis[148,210,131,62,208].

1.2.2 Otitis media and conjunctivitis

Any viral or bacterial infection of the upper respiratory tract, including influenza A and B, increases the likelihood of otitis media in children[36,101]. Influenza A and B may cause otitis media either by direct viral invasion or by predisposing to bacterial superinfection. Little is known about influenza conjunctivitis, but the virus has been isolated from the conjunctiva in some patients[77,125].

1.2.3 Cardiovascular

Sudden death of young patients has been reported after influenza myocarditis or pericarditis, probably due to arrhythmia[167]. Even though influenza primarily involves the respiratory system, 43% of patients with confirmed influenza A had transient electrocardiographic changes in one community with epidemic disease[167,218]. During the Asian pandemic in 1957, one third of fatal cases with autopsies had signs of focal or diffuse myocarditis.

In a case study of nine patients with influenza-like symptoms and serological conversion for influenza A, cardiac involvement with increasing dyspnea was found after 4-7 days post infection[169]. The ECG and echocardiography showed abnormalities and serum creatine kinase (CK) levels were increased. Two of the patients had fulminant myocarditis and a third patient died of pneumonia. The remaining six patients returned to normal left ventricular function.

Theories explaining the pathogenesis of viral myocarditis include direct invasion of the cardiac muscle, autoimmune mechanisms, or vascular damage[167]. In some cases of myocarditis, the virus could be grown from heart tissue[167,176,53]. The most frequent finding in adults, however, is the aggravation of pre-existing cardiac pathologies. Atrial fibrillation is common in older patients, and myocardial infarction may occur following influenza infection[162,154].

1.2.4 Central Nervous System (CNS)

Influenza infection of the CNS has been associated with a wide spectrum of manifestations, from drowsiness and irritability to seizures and severe coma. Two specific syndromes have been described: a sometimes-fatal encephalopathy occurring at the peak of the disease, and occasional postinfluenzal encephalitis, seen 2-3 weeks after recovery.

There is high incidence of serious neurologic manifestations in children in Japan, that has not been observed in other countries[43,188,66,103,73,142]. In 5 influenza seasons in this country, 64 infants and children were identified with influenza-related encephalitis or encephalopathy. Forty-three percent of these children died and 20% had neurological sequellae[43]. Generalized vasculopathy was found in an autopsy. Another study identified 217 cases of encephalopathy/encephalitis in children in an epidemics of A H3N2 in Japan, 82.5% were younger than 6 years. Some of these cases were associated with acute necrotizing encephalopathy[43,113].

Another complication associated with influenza is Reye's syndrome: acute encephalopathy with fatty micro-infiltration of the liver and liver failure. It has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (also after acetylsalicylic acid administration to children with chickenpox or other viral diseases). It is rare in adults[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The most frequent laboratory abnormality is the elevation of ammonia in blood, seen in almost all patients. As death is usually due to cerebral edema, lowering intracranial pressure is the most effective treatment. The recognition of the association of this syndrome with the use of acetylsalicylic acid lead to the recommendation for the use of other agents to manage children with influenza, and to a decrease in the number of cases.

Guillain-Barre Syndrome and myelitis have also been reported after influenza infections, but epidemiological studies supporting a causal association are lacking[66,103,77,185].

1.2.5 Muscular system

Acute rhabdomyolisis, with tender leg muscles and elevated serum CK occurs most frequently in children with influenza B infections; but it is also observed, occasionally, in adults or after influenza A infections. The course is usually benign, but sometimes-severe myonecrosis and myoglobinuria may lead to acute, occasionally fatal, renal failure. Influenza viruses have been recovered from affected muscles of some patients[117,145,47,151,150,234,45,182].

1.2.6 Systemic: Toxic shock syndrome

Toxic shock syndrome (TSS) is characterized by fever, hypotension, erythroderma followed by desquamation, and multiorgan failure. This syndrome is associated mainly with infections by *Staphylococcus aureus* and the production of an exotoxin (TSST-1or exotoxin B); group A *Streptococcus* may also be involved. TSS was originally associated with cutaneous and subcutaneous infections, and with menstruating and postpartum women. A link with post-influenza complications in previously healthy children and adults was found recently, after outbreaks of influenza A and B. The supposed pathogenic mechanism is a change in the colonization and replication of *S. aureus* (patients may be asymptomatic carriers of *S. aureus*) facilitated by the influenza infection. The patient may develop staphylococcal tracheitis or pneumonia and only a superficial infection of the tracheobronchial tree is required for the development of TSS[199,138].

1.2.7 Other

Another complication that has been related to influenza infection is the sudden infant death syndrome (SIDS), but a usal relationship has not been demonstrated[236,49,225,19,156].

Table 1.1. Patient factors which may delay recovery from influenza infection and facilitate the development of influenza-related complications

High-risk conditions: (Co-morbidity)	References
Age: 2 or 65 years	59, 29, 1, 152, 183, 192, 82, 57, 10, 9, 196
Pregnancy (2nd and 3rd trimesters)	159, 158, 1, 123, 144, 42
Cardiovascular diseases: Congenital, rheumatic, ischemic heart disease, congestive heart failure	78, 158, 13, 93, 162, 154, 81
Bronchopulmonary diseases: asthma, bronchitis, bronchiectasis, emphysema, cystic fibrosis	78, 158, 79, 77, 151, 93, 160
Metabolic diseases: diabetes	216, 158, 74, 124, 46, 136, 93
Renal diseases	79, 77, 78, 93, 24, 163
Malignancies	221, 61, 116
Immunodeficiency, AIDS, immunosuppression, transplant recipients	132, 184, 141, 134, 158, 183, 180, 210, 175
Diseases of the blood, anemia, hemoglobinopathy, oncologic disorders	230, 215, 4, 23, 22

High-risk conditions: (Co-morbidity)	References
Hepatic diseases, cirrhosis	50
Long-term salicylate therapy and younger than 18 years of age (Kawasaki disease, rheumatoid arthritis, acute rheumatic fever, others)	59, 5, 151, 77

Table 1.2. Complications of Influenza

Complications of Influenza	Major Clinical Category	References
Respiratory	› Upper respiratory: Otitis media, sinusitis, conjunctivitis › Acute laryngotracheo bronchitis (croup) › Bronchitis › Bronchiolitis › Pneumonia: Primary viral, secondary bacterial, combined › Complication of pre-existing disease	36, 77, 77, 151, 183, 76, 68, 21, 162, 93, 162, 130, 132, 84, 60, 168, 204
Cardiovascular	› Pericarditis › Myocarditis › Complication of pre-existing disease	167, 218, 176, 53, 154, 169
Muscular	› Rhabdomyositis › Rhabdomyolisis with myoglobinuria and renal failure	117, 145, 47, 150, 234, 45, 182
Neurologic	› Encephalitis › Reye's syndrome › Guillain-Barre › Transverse myelitis	43, 188, 66, 73, 103, 113, 105, 151, 77
Systemic	› Toxic shock syndrome › Sudden death	138, 199, 167, 149, 49, 236, 225, 19, 156

Table 1.3. Comparative features of pulmonary complications of Influenza [210]

	Primary Viral Pneumonia	Secondary Bacterial Pneumonia	Mixed Viral-Bacterial Pneumonia	Localized Viral Pneumonia
Setting	› Cardiovascular disease › Pregnancy › Young adult	› 65 yr › Pulmonary disease	Any, associated with influenza A or B	? Normal
Clinical history	Relentless progression from classic 3-day flu, rapid deterioration	Improvement and then worsening	Progression from classic influenza or biphasic pattern	Continuation of classic 3-day syndrome
Physical examination	Bilateral findings, no consolidation	Consolidation	Consolidation	Area of crackles
Sputum bacteriologic findings	Normal flora	› Pneumococci › *Staphylococcus aureus* › *Haemophilus influenzae*	› Pneumococci › *Staphylococcus aureus* › *Haemophilus influenzae*	Normal flora
Chest x-ray infiltrate	Bilateral findings	Consolidation	Consolidation	Segmental
White blood cell count	Leukocytosis with shift to the left	Leukocytosis with shift to the left	Leukocytosis with shift to the left	Usually normal
Isolation of Influenza virus	Yes	Yes/no	Yes	Yes
Response to antibiotics	No	Yes	Often	No
Mortality	High	Low	Variable	Very low

2.1 Initial Assessment Management

The algorithms shown in this chapter were designed to be used by healthcare staff and also by volunteers with minimal triaging experience to identify influenza patients who present to the health clinics, doctor's offices, emergency rooms, temporary emergency services, or other influenza triaging centres. Assuming that there will be a large number of cases and limited resources during a pandemic, the assessment guidelines are intended to evaluate the needs of each individual, and triage influenza patients efficiently in a crisis situation. Triage personnel will decide when patients can be managed in an ambulatory setting, redirected home, sent to an alternate care site, or admitted to an acute care hospital.

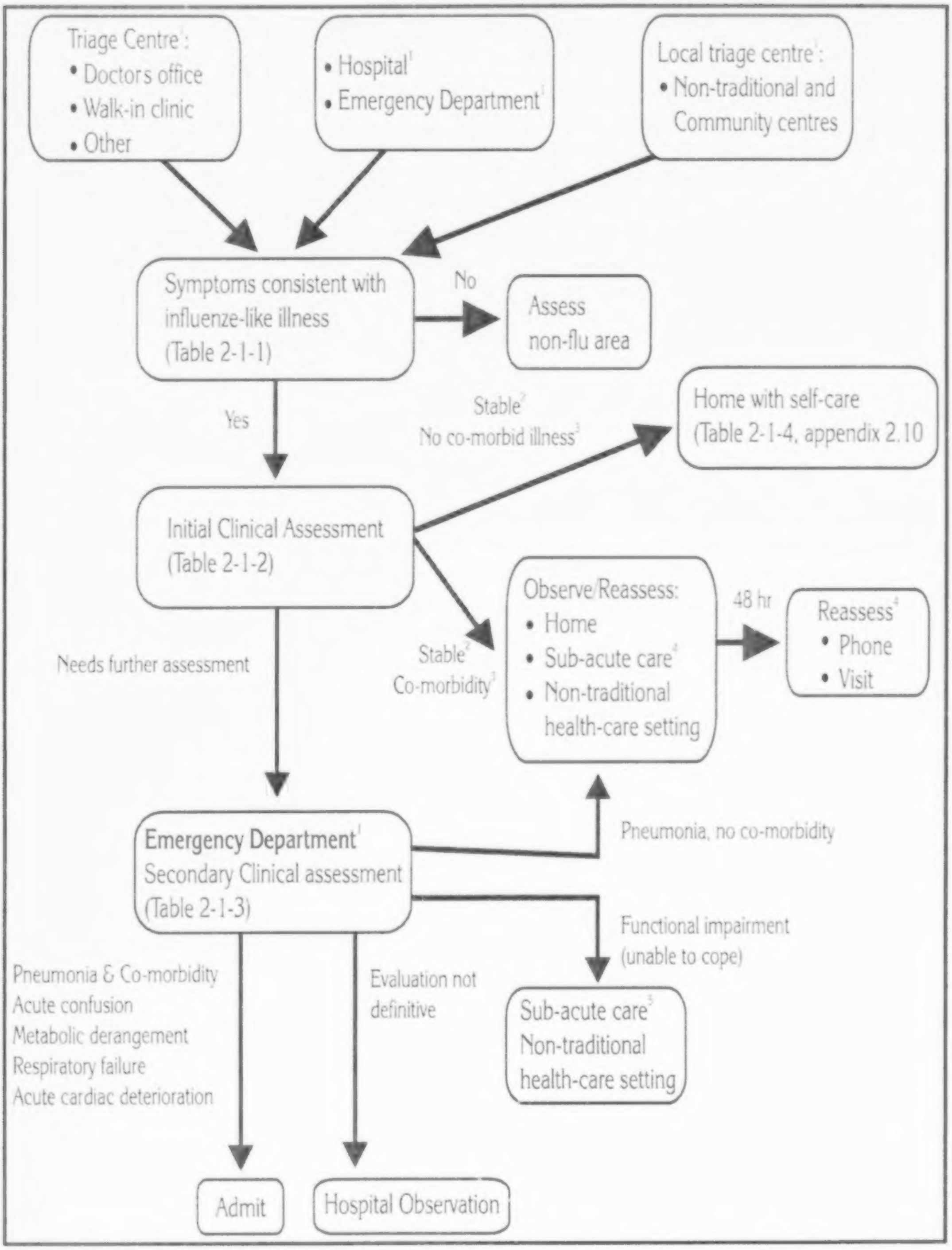
Two algorithms are included in this chapter, one for adults and adolescents (Section 2.1), and a second for children (Section 2.2). There is no clear age limit for the use of these algorithms. Depending on the age of the patient, place of consultation, and on the number of cases of influenza in a given community, young children and adolescents may be seen by personnel specialized in childcare or by the same staff and volunteers who assess the adult population. Nevertheless, influenza can be more severe in youngsters, and different criteria should be used to judge the seriousness of the illness in children (Section 2.2).

Healthy seniors living in the community can be evaluated as other adults (Section 2.1). Nevertheless, elderly individuals are also at increased risk for complications of influenza and those over 65 years of age should be monitored closely (see Chapter 1).

Management of patients/residents in long-term care facilities is discussed in Chapter 3. Because of their age and/or underlying medical condition, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. In a pandemic situation it is expected that long-term care residents will remain in the long term care facility for treatment.

These algorithms were designed mainly for urban centres that have a variety of health resources as well as alternative sources of assistance. See Chapter 6 for assessment recommendations tailored to the health care resources found in rural and isolated communities.

Triage of adults (≥ 18 years)


Triage Centre[1]:
• Doctors office
• Walk-in clinic
• Other
• Hospital[1]
• Emergency Department[1]
Local triage centre[1]:
• Non-traditional and Community centres
Symptoms consistent with influenze-like illness (Table 2-1-1)
No
Assess non-flu area
Yes
Stable[2]
No co-morbid illness[3]
Home with self-care (Table 2-1-4, appendix 2.10
Initial Clinical Assessment (Table 2-1-2)
Observe/Reassess:
• Home
• Sub-acute care[4]
• Non-traditional health-care setting
48 hr
Reassess[4]
• Phone
• Visit
Needs further assessment
Stable[2]
Co-morbidity[3]
Emergency Department[1]
Secondary Clinical assessment (Table 2-1-3)
Pneumonia, no co-morbidity
Functional impairment (unable to cope)
Pneumonia & Co-morbidity
Acute confusion
Metabolic derangement
Respiratory failure
Acute cardiac deterioration
Evaluation not definitive
Sub-acute care[5]
Non-traditional health-care setting
Admit
Hospital Observation

Legend:

1) Triage centres may be located at doctor's offices, clinics, and in non-traditional (NT) sites such as schools, churches, community centres, military field hospitals, etc. When possible, hospitals should assign a special "emergency" area for the triage, secondary assessment and treatment of influenza patients, avoiding the passage of these patients through the regular Emergency Department.

2) Stable: Patient with ILI but without abnormalities meeting the criteria for secondary assessment (Table 2.1.2).

3) Co-morbidity:
    - 65 yr
    - pregnancy
    - chronic lung disease (e.g., chronic obstructive pulmonary disease, cystic fibrosis, asthma)
    - congestive heart failure
    - renal failure
    - immunosuppression (due to underlying disease or therapy)
    - haematological abnormalities (anemia, haemaglobinopathies)
    - diabetes
    - hepatic disease
    - socially unable to cope (i.e., without personal support at home, such patients may need an alternative centre of care). An alternate care arrangement may also be considered if a high-risk individual lives in the same household as the influenza patient.
    - Patients on long-term acetylsalicylic acid therapy (increased risk of Reye's syndrome).

4) Neighbourhoods should develop local plans for the support, assessment and control of influenza patients at home (e.g., "Flu-block" watch). Some individuals may not be able to self-care at home and will therefore need community support or an alternate care centre. When possible, individuals from the same household should be kept together.

5) In addition to providing sub-acute care, some local NT sites may be able to handle patients more critically ill (Please see Non-traditional Site Guideline, Annex J).

Symptoms consistent with flu like illness

Clinical Case Definition:

When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38 C and when the onset of clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache may also be present. Any case definitions developed prior to the pandemic may need to be modified once the pandemic occurs. A history of contact with another patient with influenza-like illness or with an influenza case confirmed by the laboratory should be sought. If present, it is of diagnostic value.

Adults ((18 years)

a) **Systemic**

- Fever
- Chills
- Headache
- Aching muscles and joints
- Stiffness
- Weakness

b) **Respiratory**

- Cough
- Sore throat
- Hoarseness
- Stuffy or runny nose
- Shortness of breath (patients with influenza and shortness of breath should undergo chest radiography)
- Chest symptoms: thoracic pain when taking a deep breath, retrosternal tracheal pain, pleuritic pain (see legend of Table 2.1.2)
- Red and/or watery eyes
- Earache

c) **Digestive (seen mainly in children and elderly)**

- Vomiting
- Diarrhoea
- Abdominal pain

d) **Neurological**

- Confusion, drowsiness
- Convulsions
- Symptoms suggestive of meningitis (mainly in children)

Initial influenza illness assessment (≥ 18 years)

Primary Assessment	Results Requiring Secondary Assessment
Temperature[a]	35°C or 39°C
Pulse	New arrhythmia (irregular pulse) >100 beats/min (if 16 years)
Blood pressure	100 systolic Dizziness on standing
Respiratory rate	24/minute (tachypnea)
Skin colour (lips, hands)	Cyanosis
Chest signs or symptoms[b]	Any abnormality on auscultation or chest pain
Mental status	New confusion[c]
Function	New inability to function independently[c] Persistent vomiting (2-3 times/24 hr.)[d]
Oxygen saturation[e]	90% room air

[a] For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever (39 C) in adults or in adolescents needs further assessment.

[b] Chest pain should always be investigated because it may be a sign of pneumonia (chest pain on inspiration), or may be a sign of cardiac failure. It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

[c] A deterioration in level of consciousness or inability to function independently compared with previous functional status should be further investigated, particularly in elderly patients.

[d] Vomiting (2-3 times/24 hr.), particularly in elderly patients, requires further assessment.

[e] Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III)

› If no abnormality and no co-morbidities are found: send home with instructions for self-care (2.1.4 and Appendix 2.I).

› If no abnormality, but co-morbidity: send home with instructions for self-care (2.1.4 and Appendix 2.I) and with reassessment after 48 hr; or send to non-hospital domicile. Follow-up.

› Co-morbidities: >65 yr, pregnancy, chronic lung disease, congestive heart failure, renal failure, immunocompromised, haematological abnormalities, diabetes, neoplastic disease, hepatic diseases, socially unable to cope (i.e., non supportive household).

› If secondary assessment is required, and the patients are sent to another centre/ward for complementary evaluation (see 2.1.3) each individual should be provided with a summary of the clinical/laboratory data. Some triage centres may have the facilities to perform secondary assessment and treatment without transferring patients.

Secondary influenza illness assessment (≥ 18 years)

When the patient's secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the diagnosis at the primary triage centre should precede laboratory studies. Not all the tests mentioned below will be needed for all patients, and clinical assessment should determine which procedures are done, particularly if resources are scarce:

Complementary laboratory studies	Results requiring supervision or admission
CBC (core battery, if appropriate)[a]	Hgb 80 g/l WBC 2.500 or 12, 000 Bands[b] >15% Platelets 50,000/ L
Electrolytes	Na 125 meq/L or 148 meq/L K 3 meq/L or 5.5 meq/L
BUN, creatinine	BUN 10.7 mmol/L Creatinine 150 mol/L
Glucose	3mmol/L or 13.9 mmol/L
CPK (only in patients with severe muscle pain)	CKMB 50% Total CK 1,000 /L
Blood gases, O2 saturation (see Appendix 2.III)	Blood gases p02 60 room air O2 saturation 90% room air
Chest x-ray (CXR)[a]	Abnormal, consistent with pneumonia or with congestive heart failure
EKG (clinical criteria)	Evidence of ischemia, new arrhythmia

[a] Under optimal circumstances, blood work and CXR should be obtained before admission. If resources are limited, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Patients with normal gases and normal chest auscultation do not need CXR. Likewise, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CXR need to be taken unless there is suspicion of a complication of the pneumonia (i.e., empyema). If antibiotics are limited, however, CXR may be indicated to confirm pneumonia before prescribing any drug. Conversely, if pneumonia is suspected but the radiology resources are limited, antibiotics may be prescribed without radiological confirmation.

[b] An increase in the number of circulating neutrophil-bands (i.e., immature neutrophils, with an elongated, non-segmented nucleus) suggests bacterial infection. Mean normal values of bands are 12.4% (range 9.5-15.3%)[229]. In a typical acute bacterial infection, the ratio bands/segmented neutrophils may go up to values of 16-17%[228].

Microbiologic Diagnostic tests

Microbiologic diagnostic tests (bacteriologic and/or virologic) may be appropriate for secondary assessment. They will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions (see Appendix 5.II). Isolation and culture of the virus is needed for surveillance purposes.

Ideally, purulent sputum will be analysed by Gram staining and culture to identify infecting bacteria and their susceptibility. In a pandemic, these studies should be reserved for patients admitted to hospitals, especially those in intensive care or those failing initial antibiotic therapy. If culture is not possible, Gram staining should be attempted.

Ideally, blood cultures should be obtained prior to antibiotic therapy in patients with pneumonia. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

Sample	Test
Sputum (purulent)	Bacteriologic: Gram and culture
Blood (only for very ill patients or for patients who do not respond to 48h of treatment with antibiotics)	Bacteriologic: Culture
Nasopharyngeal aspirate (only for atypical cases or for surveillance)	Virologic: Virus antigens, RNA, culture

Instructions for self-care of subjects sent home (≥ 18 years)

No co-morbidity:

- Acetaminophen (adults or children), ibuprofen or acetylsalicylic acid (adults only), to treat myalgia and arthralgia*.
- Fluids
- Bed rest
- Drink hot liquids
- Decongestants
- Do not smoke or expose to second hand smoke
- Seek help if:
  - Increasing shortness of breath
  - New pleuritic, chest pain
  - New purulent sputum
  - Persistent vomiting

Co-morbidity: in addition to above

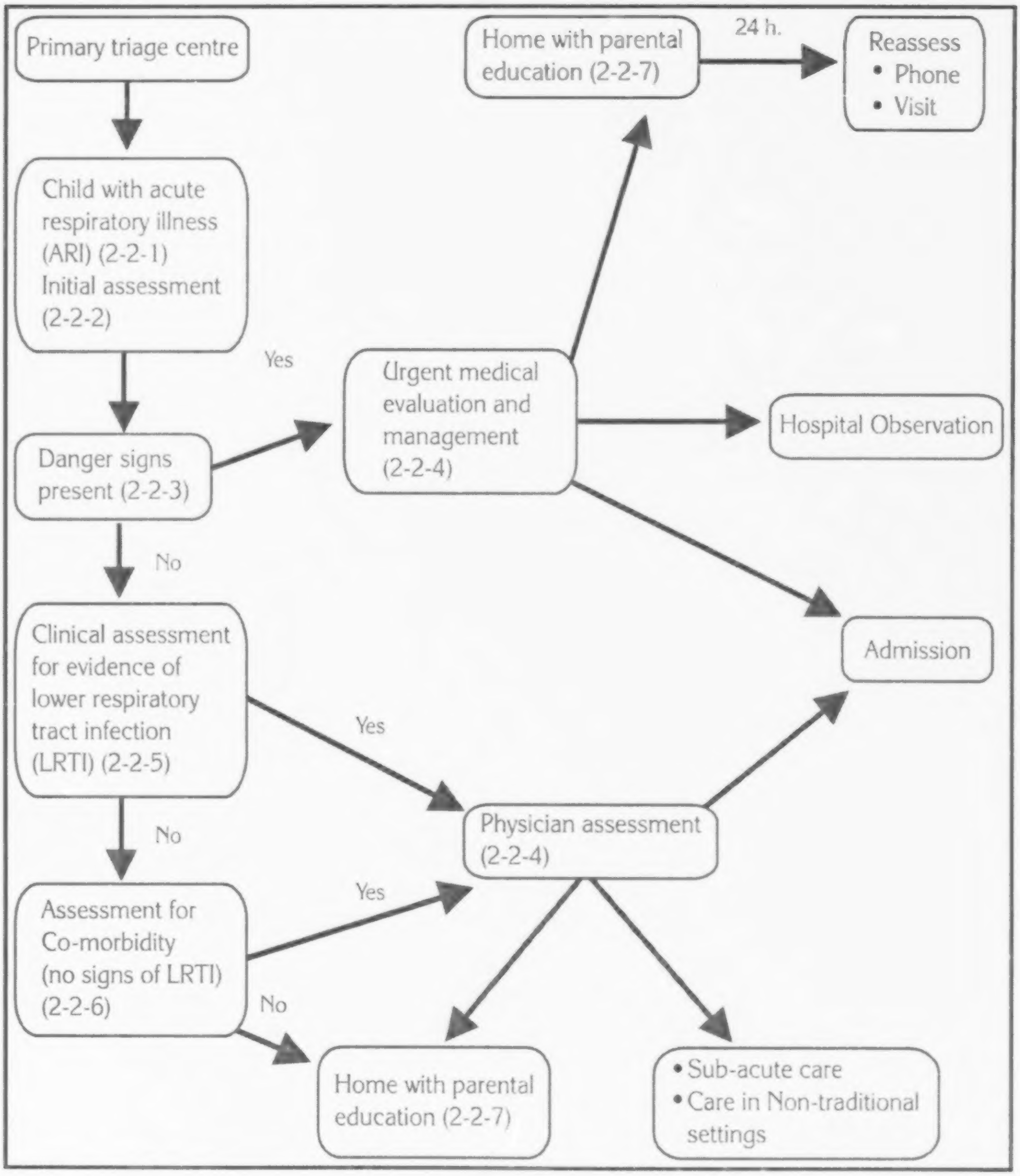
- Supervision (family, friends, allied health, nurse)
- Antiviral therapy (if seen before 48 hours of onset, contingent on pandemic priorities)
- Follow-up after 48 hours by phone call/ health care worker visit.

* A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye's syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (ASA) e.g., Aspirin[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, lead to the recommendation for the use of other agents and a decrease in the number of cases.

The province of Alberta developed a self-care plan for the management at home of uncomplicated cases of influenza[200]. It has been developed for interpandemic influenza and will be evaluated during the 2002-2003 influenza season. Appendix 2.I. is a summary of this plan, which has been adapted to be used nationwide, and in a pandemic.

2.2 Pediatric Triage

This algorithm was designed to help medical and healthcare staff, as well as lay persons with minimal knowledge and experience, to manage children with influenza-like illness during a pandemic. Triage centres may be located at the doctor's offices, clinics, hospitals, and in non-traditional care settings (schools, churches, community centres, military field hospitals, etc). The numbers in each of the following boxes refer to sections within this document where additional information can be found.


Primary triage centre
Child with acute respiratory illness (ARI) (2-2-1) Initial assessment (2-2-2)
Danger signs present (2-2-3)
Yes
Urgent medical evaluation and management (2-2-4)
Home with parental education (2-2-7)
24 h.
Reassess
• Phone
• Visit
Hospital Observation
Admission
No
Clinical assessment for evidence of lower respiratory tract infection (LRTI) (2-2-5)
Yes
Physician assessment (2-2-4)
No
Assessment for Co-morbidity (no signs of LRTI) (2-2-6)
Yes
No
Home with parental education (2-2-7)
• Sub-acute care
• Care in Non-traditional settings

Child with acute respiratory illness (ARI,[107]) (i.e., one respiratory symptom and fever)

The most common presentation of influenza in children is fever and cough of sudden onset. The term ARI is preferred for children since most distinguishing features in adults are not characteristic in children until the second decade. Young infants (less than 2 months old) can become ill and progress to severe illness rapidly. They are much less likely to cough with pneumonia and frequently have only non-specific signs such as poor feeding, apnea, and fever or low body temperature.

Systemic:

- Fever (38 C core temperature)
- Apnea

Respiratory symptoms:

- Cough,
- Nasal congestion and/or rhinorrhea (second most common presentation),
- Difficulty breathing (including chest retractions, stridor, etc.)
- Fast breathing* (tachypnea)
- Hoarse voice
- Earache

*Definitions of fast breathing (tachypnea)[222]

< 2 months = >60 breaths per minute
2-12 months = >50 breaths per minute
> 12 months to 5 years = >40 breaths per minute
> 5 years = > 30 breaths per minute

Associated non-respiratory symptoms:

- Not feeling well, malaise
- Low energy, lethargic
- Not playing,
- Needing extra care
- Poor feeding
- Vomiting, diarrhoea
- Irritability, excessive crying, fussy

Initial influenza illness assessment (<18 years)

Primary Assessment	Results Requiring Secondary Assessment
Temperature[a]	C or 9°C
Respiratory rate	< 2 months = >60 breaths per minute 2-12 months = >50 breaths per minute > 12 months to 5 years = >40 breaths per minute > 5 years = > 30 breaths per minute
Skin colour and temperature (lips, hands)	Cyanosis, sudden pallor, cold legs up to the knee
Chest signs and symptoms[b] (pain may be difficult to detect in young children)	Chest indrawing, wheezing, grunting, inquire for chest pain
Mental status	Lethargic or unconscious, confused[c]
Function	Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.)[d] Inability to function independently[c]
Neurologic symptoms and signs	Convulsions, full fontanelle, stiff neck, photophobia
Oxygen saturation[e]	0% room air

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever (9 C) in adolescents is a warning sign and needs further assessment.

b Children with ARI and chest pain should always have medical evaluation, since it may be a sign of pneumonia (chest pain on inspiration). It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain.

c A deterioration of consciousness and functional status, lack of interest in playing and inappropriate sleepiness should be further investigated.

d Vomiting (>2-3 times/24 hr.), particularly if the children are not feeding or drinking well, requires secondary assessment.

e Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III)

Note: If the child must be transported for secondary assessment (see 2.1.3) a summary of the clinical/laboratory data should accompany the patient. Some triage centres, however, may have the facilities to perform secondary assessment and treatment without moving the patients.

Danger signs (paediatrics): (2 months to 5 years old)[222]

- Difficulty breathing (chest indrawing or nasal flaring or grunting or stridor or fast breathing)
- Cyanosis
- Unable to breastfeed or drink
- Vomiting everything (continuous vomiting)
- Lethargic or unconscious or confused
- Convulsions/seizures
- Full fontanelle

- Stiff neck, photophobia

When these danger signs are present in infants younger than 2 months, they suggest very severe disease and may be life threatening. These children should always be referred immediately for physician assessment. Additional danger signs in children under 2 months include:

- The child stopped feeding well (less than half of the usual amount of fluids)
- Fever or low temperature (high fever can represent a serious infection, but low temperature may also be present)
- Wheezing
- Grunting or stridor when calm
- Severe chest indrawing
- Abnormally sleepy or difficult to wake
- Poor circulation: sudden pallor, cold legs up to the knees
- Less than four wet diapers in 24 hours
- Signs of pneumonia (pneumonia in young infants is considered very serious and these children should be referred urgently to a hospital for evaluation)

Urgent medical assessment (paediatrics)

While a primary care provider may give first aid, children with danger sign must be seen by a physician.

Secondary assessment (<18 years)

When the patient's secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the primary assessment should precede laboratory studies. Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce.

Complementary laboratory studies	Results requiring supervision or admission
CBC (core battery, if appropriate)[a]	Hgb[b] 8.0 g/dL WBC[c] 2,500 or 12, 000 cells/ l Bands[d] >15% Platelets[e] 0,000/ l
Electrolytes	Na[f] 25 meq/L or 148 meq/L K[f] 3 meq/L or 5.5 meq/L
BUN, creatinine	BUN[f] 0.7 mmol/L Creatinine[f] 50 mol/L
Glucose[f]	3mmol/L or 13.9 mmol/L
CPK[f] (only in patients with severe muscle pain)	CKMB 0% Total CK ,000 mol/L
Blood gases, O2 saturation	Blood gases p02 0 room air O2 saturation 0% room air
Chest x-ray (CXR)[a]	Abnormal, consistent with pneumonia

Legend:

a) Under optimal circumstances, blood work and CXR should be obtained for all patients before admission. When resources are restricted, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Similarly, when the clinical diagnosis of pneumonia is definite and resources are scarce, no CXR is needed, unless there is suspicion of a complication of the pneumonia (i.e., empyema). When antibiotics are limited, CXR may be an indication to confirm pneumonia before prescribing any drug and, if pneumonia is suspected but the resources for CXR are in short supply, antibiotics may be prescribed without radiological confirmation.

b) Values of haemoglobin for young children are age related. Normal values for different ages are[157]:

Age	Haemoglobin g/dL	Reference values (SI) mmol/l
1-3 days	14.5 - 22.5	2.25 - 3.49
2 month	9.0 - 14.0	1.40 - 2.17
6 - 12 years	11.5 - 15.5	1.78 - 2.40
12 - 18 years (M)	13.0 - 16.0	2.02 - 2.48
12 - 18 years (F)	12.0 - 16.0	1.86 - 2.48

c) Values of WBC for young children are age related. Normal values for different ages are[157]:

Age	Cells/μ L (limits)	Reference values (SI) 10^9 cells/L
Birth	9,000 - 30,000	9.0 - 30.0
24 h	9,400 - 34,000	9.4 - 34.0
1 month	5,000 - 19,500	5.0 - 19.5
1-3 years	6,000 - 17,500	6.0 - 17.5
4-7 years	5,500 - 15,500	5.5 - 15.5
8-13 years	4,500 - 13,500	4.5 - 13.5
> 13 years	4,500 - 11,000	4.5 - 11.0

d) In a typical acute bacterial infection, the ratio bands/segmented neutrophils may increase up to 16-17%[228]. Mean values of bands in normal individuals are 12.4 % (range 9.5-15.3%)[229].

e) Normal values for children older than one week are the same as for adults[157].

f) Values normal for infants/children[157].

Analyte	Age ranges	Normal values
Sodium	Infants Children Thereafter	139 - 146 mmol/L 138 - 145 mmol/L 136 - 146 mmol/L
Potassium	< 2 months 2 -12 months > 12 months	3.0 - 7.0 mmol/L 3.5 - 6.0 mmol/L 3.5 - 5.0 mmol/L
BUN	Infant/child Thereafter	1.8 - 6.4 mmol urea/L 2.5 - 6.4 mmol urea/L
Creatinine	Infant Child Adolescent	18 - 35 mol/L 27 - 62 mol/L 44 - 88 mol/L
Glucose	Child	3.3 - 5.5 mmol/L

Microbiologic Diagnostic tests

See adult assessment

Clinical assessment for evidence of LRTI (paediatrics)

a) **Clinical assessment**

- Crackles
- Wheeze
- Tachypnea (fast breathing), use of accessory muscles
- Consolidation
- Poor air entry

Any young infant (< 2 months) with pneumonia has a severe, life threatening infection. The most important signs to consider when deciding if a young infant has pneumonia are:

- Breathing rate (60 times/minute)
- Severe chest indrawing, use of accessory muscles

b) **Secondary assessment (laboratory):**

- Chest radiograph (CXR)
- Respiratory tract specimen for diagnosis (e.g., nasopharyngeal aspirate, sputum on children over 7 years of age)
- Blood work
- Other diagnostic tests (as required).

Determine if patient has co-morbidity of concern

(No evidence of lower respiratory tract infection).

According to NACI, patients at "high risk for complications from influenza" include[152]:

- Chronic cardiac or pulmonary disorder (bronchopulmonary dysplasia, cystic fibrosis, asthma) severe enough to require regular medical follow up or hospital care,
- Chronic conditions such as diabetes and other metabolic diseases,
- Cancer,
- Immunosuppression (due to underlying disease and/or therapy),
- Renal disease,
- Anaemia, hemoglobinopathy,
- Residents of chronic care facilities,
- Patients on long-term acetylsalicylic acid therapy (increased risk of Reye's syndrome).

Asthma and diabetes are the most frequent co-morbidities found in young children. Premature babies and low-weight infants should also be included in this list. All children younger than 2 years of age may be considered as high-risk patients[29].

Socio-economic issues such as age and education of the parents, single parents, multiple young siblings, support at home by other family members, etc., should also be taken into account when sending a child back home. Similarly, whether other individuals at home have high risk of influenza associated complications (siblings with chronic diseases, elderly grandparents, etc.) should be evaluated.

Children at risk for influenza-associated complications (no signs of LRTI). Consider physician assessment to determine eligibility (in agreement with the pandemic guidelines) for:

- Antiviral therapy (within the framework of antiviral prioritization for pandemic influenza, Appendix 5.III).
- Stopping ASA *
- Immunization of patient and family if not already done (according to the pandemic guidelines).
- Plan follow up
- Setting for care (admission, home, institution etc). When possible, members of the same household should be kept together.

Parental/patient education

Children without co-morbidities presenting with uncomplicated influenza infection may be sent home with parental education regarding:

- Maintaining hydration
- Fever management (avoid salicylic acid*)
- Watching for signs of deterioration, failure to improve
- When to return
- Follow up plan if necessary
- Mothers of young infants should be told to return to the health centre immediately if the child worsens or does not feed well, or if breathing becomes difficult.
- Immunization/prophylactic treatment of high-risk contacts in the household (abide by existing pandemic guidelines).
- Infection control practices such as avoiding close contact with othersand paying attention to hand hygiene, proper disposal of tissues, etc.

See Appendix 2.I.: CARING FOR YOUR-SELF: "When a child is unwell" and "how to take a child's temperature".

* A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye's syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving salicylates (ASA)[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, lead to the recommendation for the use of other agents and a decrease in the number of cases.

Appendix 2.I. Caring For Your Self

This appendix is prepared from a draft written by Ms. Diane Spillett for Alberta Health and Wellness (September 2001). The original document was designed for the province of Alberta, to reduce hospital overload during interpandemic influenza. It has been adapted to be used nationwide in a pandemic situation.

I. Staying Well

A. Be Informed About Influenza

What is Influenza?

Influenza (flu) is an infection of the cells that line the lungs and airways (the respiratory system). In North America it usually affects people during the winter (November - April). It is caused by one of three types of viruses - Influenza A, Influenza B, and Influenza C. Influenza A usually causes the worst illness, Influenza B is more common in children and Influenza C is rare. **Only influenza A has been associated with pandemics**.

The influenza viruses that circulate every winter are related to those from the preceding epidemics. These viruses spread among people with varying levels of immunity (body defences) following infections earlier in life. Over a period of 2 or more years, this circulation promotes the selection of new viruses that have changed enough to again cause epidemic infection among the general population.

At unpredictable intervals, "**novel influenza viruses emerge, which are totally different from strains circulating the year before. If such viruses have the potential to spread readily from person-to-person, then more widespread and severe epidemics may occur, usually to a similar extent in every country within a few months to a year, resulting in a pandemic**."[223]

How is Influenza Spread?

Influenza is very contagious. People can pass the virus for up to seven days or more, beginning from the day before they have the first symptoms of the illness. People breathe-in the virus from particles in the air when they are around those who have the flu and who have been talking, coughing, or sneezing. The virus can travel from 1 - 2 meters in the air, and can live several hours on your hands and surfaces. People can also become infected when they touch those who are ill (e.g., kiss them or shake their hand), or contact objects on which viruses have landed (e.g., telephones, door knobs, dishes, handrails), and then touch their own nose, mouth or eyes. It is especially easy for the virus to spread where there are crowds or where people live or work/study close together. The flu virus lives longer in cool, dry places. It can live for one or two days on hard surfaces, and 8-12 hours on cloth, tissue and paper.

What are the Symptoms of Influenza?

A person develops symptoms of the flu within one to three days after becoming infected with the virus. They suddenly develop a fever and possibly chills, and may have a headache and aching muscles, especially in the back and legs. They usually have a dry cough and feel weak and tired. Some people have a sore throat and a runny or stuffy nose. They probably won't feel like eating. In general, people feel very sick and want to stay in bed. The fever usually falls in three to five days, and the person begins to feel better. However, tiredness and a cough can sometimes continue for several weeks.

People often mistakenly refer to stomach upsets and colds as "the flu". Influenza is quite different from both of these. It rarely causes vomiting and diarrhoea, but may do so in young children or elderly individuals. Unlike influenza, the common cold comes on gradually, rarely causes a fever, and is usually limited to a sore throat, coughing and sneezing, and a stuffy, runny nose. It is generally milder than influenza and people can carry on with their usual activities.

How Serious is Influenza?

Most healthy people recover from influenza without any serious problems. However, there are certain groups of people who are "at risk" of developing complications which can be very serious, and even cause death.

Some people, such as very young children and the elderly, are "at risk" because they have weaker body defences (immune systems). Pregnant women, particularly those who are in the second and third month of their pregnancies, have also increased risks of pneumonia, lung insufficiency, and death after influenza infections. Similarly, those with diseases such as cancer and HIV/AIDS, people who have had organ transplants and persons who take certain medications frequently develop complications.

Another group of people "at risk" are those who have chronic (long term) conditions such as heart disease, lung disease (asthma, cystic fibrosis, emphysema), kidney disease and diabetes. When a body system is not strong, it is easier for bacteria to invade the cells that have been damaged by the flu virus and cause other illnesses such as pneumonia. Influenza can also stress the body so much, that the underlying chronic illness may be worsened.

Children under the age of eighteen years and who have influenza **should avoid taking acetylsalicylic acid (ASA), e.g., Aspirin**, because they can develop a very serious illness affecting the nervous system and liver, called Reye's syndrome. It is important for parents of children who need to take ASA on a regular basis for a health problem, to discuss possible complications associated with influenza with their doctor, and find out what they can do to reduce the risk.

For More Information

If there is an outbreak of pandemic influenza in your community, watch the television or listen to the radio for up to date information, or access the Health Canada website at http://www.hc-sc.gc.ca/.

If you have questions about somebody in your household that may have the flu, call the Public Health Centre in your area.

B. Protect Yourself Against Influenza

Immunization

Vaccination is the best way to avoid or to lessen the severity of influenza.

Vaccination is advised once a vaccine with the pandemic strain becomes available. Priorities for vaccination, including the types of individuals that should be immunized first if vaccine supply is limited, have been identified in the Canadian Pandemic Influenza Plan and will be confirmed at the time of a pandemic.

Who Should Get the Flu Vaccine?

Vaccine supply may be limited during the early stages of the pandemic; therefore the Pandemic Influenza Committee (PIC) will define priority groups, which should be immunized first. This prioritization will evaluate the impact that the vaccine may have on: a) reducing morbidity and mortality by maintaining the health services response, and by individual protection of high-risk groups, and b) minimizing societal disruption by maintaining essential services (as stated in the pandemic guidelines, Vaccines section).

Call the Public Health Centre in your area to learn about vaccine availability and to find out if any of the members of your household belongs to a priority group. They will also inform you where they are holding "Flu Clinics" for immunization. Some doctors may provide the vaccine to their patients. Two shots may be required (as per pandemic guidelines).

The vaccine is safe for pregnant women, breast-feeding mothers and children. It is not effective for children under the age of 6 months.

Who Should NOT get the Flu Vaccine?

People who are severely allergic to eggs should not receive the vaccine, as viruses used in making the vaccine are grown in eggs. Rarely, a person has had an allergic reaction to some other ingredient in the vaccine - a raised itchy rash, swollen throat or tongue, red itchy eyes or possibly a swollen face within 12 hours of getting the injection. These people should not get be vaccinated again.

If a person is "at risk" for getting serious complications from influenza and cannot be vaccinated, their doctor may wish to prescribe an antiviral drug to give them some protection during the pandemic. Antivirals stop the flu virus from multiplying. It is a good idea to ask your doctor about this medication, if you are allergic to the vaccine. He/she will need to consider your medical problems, available medications (the Pandemic Influenza Committee will also define priority groups, if antivirals are in short supply), and possible side effects of the drug.

Doctors may also prescribe antivirals for:

1. People at high-risk even though they were vaccinated, if they need extra protection,
2. People who were vaccinated after the virus was present in the community, and need to be protected for the two weeks required for a response to the vaccine.
3. The public at large, if there is a pandemic and the vaccine with the pandemic strain is not available or is insufficient.

If a person has a minor illness, they can still get the flu shot. However, tell your doctor if you have a temperature of 37.8 C (100 F) or more or if you have other symptoms.

What Reactions do People have to the Flu Shot?

Some people think that they will get the flu from the flu shot. This is not possible, because the virus in the vaccine has been killed. The most common reaction to the flu shot is some redness and soreness where the needle entered the skin. This is usually gone in two days. Some people may develop a fever, tiredness and aching after six to twelve hours that may last for a day or two. More serious reactions are rare. The benefits and risks of this vaccine should be discussed with your vaccine provider as part of the informed consent process.

Hygiene

In addition to getting vaccinated, the single most important step people can take to prevent the flu is to wash their hands often.

Wash your hands often, especially after being in contact with someone who has a respiratory infection, or with children who get the virus easily and are the main spreaders of the virus in the community. Do not shake hands. It is good for everyone to get into the habit of washing their hands before meals, after using the toilet, and after they cough or sneeze or blow their nose. The sooner children are taught this, the better. It is best to wash your hands with warm soap and water, scrubbing your wrists, palms, fingers and nails for ten to fifteen seconds. Rinse and dry with a clean dry towel.

Be aware of the times you rub your eyes or touch your nose or mouth, and try to avoid these habits. This can bring the virus into your airways, if you have recently touched someone who has the flu, an object that they have used, or a surface on which the virus has settled.

Remember not to share eating utensils or drinks.

Don't visit people who have the flu unless it is absolutely necessary. If a member of your family has the flu, keep their personal items, such as towels, separate from the rest of the family. Clean surfaces (such as bathroom sinks and taps, kitchen sinks and counters) after the ill person has handled them. Wash hands after cleaning a child's nose.

Avoid large crowds.

Care for Your Self

Taking good care of yourself physically and emotionally strengthens your overall well-being and the ability of your body to fight off infections and to stay healthy. Not smoking is particularly important for the health of the lungs and airways, and drinking plenty of water helps to keep the airways moist and able to cleanse the system of unwanted material.

C. Plan Ahead

Spend a little time thinking about what you would need if you got the flu.

If you live alone, or are a single parent of young children, or are the only person caring for a frail or disabled adult, it might be a good idea to:

- Have enough fluids (juices, soups etc.) on hand to last you and your family for 1-2 weeks.
- Have enough basic household items (e.g., tissues) to last for 1-2 weeks.
- Have acetaminophen and a thermometer in your medicine cabinet. Do you know how to use/read a thermometer correctly? If not, don't be shy about asking someone to show you how.
- Think of someone you could call upon for help if you became very ill with the flu and discuss the possibility with him or her.
- Think of someone you could call upon to care for your children if their school or daycare was closed because of the pandemic, and you were required to work, and discuss the possibility with them. If you cannot think of anyone who could help you in such a situation, you can call the Public Health Centre in your area to find out what is available in the community to help with these difficulties.

II. If You Are Unwell

A. Is It The Flu?

The most prominent characteristics of the flu are the sudden appearance of a fever (38°C or 100.4°F or more), a dry cough and aching in the body, especially in the head and lower back and legs. Usually the person feels extremely weak and tired and doesn't want to get out of bed. Other symptoms can be chills, aching behind the eyes, loss of appetite, a sore throat and a runny, stuffy nose. After your symptoms first appear you can spread the virus to others for 4-6 days or more.

B. What Can You Do For Yourself?

- **Rest** - Probably, you will feel very weak and tired until your temperature returns to normal (about three days), and resting will provide comfort and allow your body to use its energy to fight the infection. You should avoid contact with others while the infection is contagious (at least six days after the first symptom appears).
- **Drink plenty of fluids** - Extra fluids are needed to replace those lost because of the fever (sweating). If your urine is dark, you need more to drink. Liquids, especially warm ones like chicken soup, help loosen mucus. Try to drink a glass of juice/water or an equal amount of some other fluid every hour while you are awake.
- **Take acetaminophen or ibuprophen** as recommended on the package to bring down your fever and ease your muscle pain (unless your doctor says otherwise). **CHILDREN UNDER 18 YEARS OF AGE SHOULD NOT TAKE ACETYLSALICYLIC ACID (ASA) OR ANY PRODUCTS CONTAINING ASA**. The combination of influenza and ASA in this age group has been known to cause Reye's syndrome, a very serious condition affecting the nervous system and liver. **ANTIBIOTICS ARE NOT EFFECTIVE AGAINST INFLUENZA** because it is a virus, and antibiotics fight bacteria. A hot water bottle or heating pad may also relieve muscle pain. A cup of Epsom salts in a warm bath may be soothing.
- **Gargle** - with a glass of warm water to ease a sore throat. Sugarless hard candy also helps, as do lozenges.
- **Use saline nose drops or spray** (ones that contain salt water but no medicine) to help soothe or clear a stuffed nose. Try not to blow your nose as this could send infected secretions into your sinuses. Wipe your nose with disposable tissues and put them in the garbage can immediately. Cover your nose and mouth with tissues when you cough or sneeze and throw them in the garbage as well. **Wash your hands often**.
- **Do not smoke** - it is very irritating to the damaged airways.
- **If you are a single parent, or you are responsible for the care of someone who is frail or disabled, you may need to call someone to help you until you are feeling better**.
- If you buy medicine at the drug store to treat your symptoms ("over-the-counter" medications), check with the pharmacist to see if it is the best one for you. Mention if you have a chronic illness or are taking any other medicine. Take into consideration that:
    - It is better to buy a remedy that treats only one symptom. This way you are not taking in substances that are doing nothing, or that may trigger an adverse reaction.

- Read the label to be sure that the ingredient treats the symptom you have.
- Extra strength remedies contain a higher dose of the ingredient. Try the standard dose first. It may work fine and not have the same risk of side effects.
- Long acting medications tend to have more side effects than short acting medications.
- Read the label and note any possible side effects or interactions with other drugs or health conditions.
- If you have a chronic condition and are taking prescription medications, it is a good idea to ask the pharmacist to suggest a medication that would be safe for you to take, if you have not already discussed this with your doctor.

Muscle pain and fever - Acetaminophen is a good choice because it causes less stomach irritation than other drugs. **Acetylsalicylic acid should not be given to children under the age of eighteen**.

A cough can be helpful if it gets rid of mucus. If a dry cough is keeping you awake, a cough suppressant, Dextromethorphan is safe and effective. If you need help loosening mucus, an expectorant such as Guaifenesin is good. It is not helpful to take a suppressant and an expectorant together.

A stuffy nose - Decongestants help shrink swollen blood vessels in the nose. There are two kinds pills and nose drops/sprays. Nose drops/sprays act in minutes. They work better and have fewer side effects than the pills. However, *they only work for 2 or 3 days, and then they make matters worse*. Oxymetazoline, Phenylephrine and Xylometazoline are nose drops/sprays. If your nose is still stuffy after three days, you may want to switch to the pills. The pills take 1/2 hour to work. They may cause dry mouth, sleep disturbances and other side effects. Pseudoephrine is a decongestant in pill form.

Sore throat - Some medications work by numbing the throat, Dyclonine works the best. Others are Benzocaine, Hexylreorcinol, Menthol and Phenol. These are lozenges or throat sprays. Other lozenges act by coating the throat. They may contain honey, herbs or pectin.

Ingredients to avoid:

- Phenylpropanolamine (PPA) has been linked with strokes.

Note: Older people may become much more sensitive to medications in general and may experience more side effects, especially to the nervous system (e.g., confusion). It is best to take no more than three or four medications at a time. This includes both prescription and over the counter drugs.

If you have any questions at all about medications, don't hesitate to talk to your pharmacist.

Generally, people begin to feel better after their temperature returns to normal, in about three days, and are ready to return to their normal activities/work in about a week. It is common for tiredness and a cough to linger on for several more weeks.

C. When To Seek Medical Attention

If you are a normally healthy person **and have been suffering with the flu, it is time to call the doctor, EMS or health help line if:**

- **You become short of breath while resting or doing very little;**
- **Breathing is difficult or painful;**
- **You are coughing up bloody sputum;**
- **You are wheezing**
- **You have had a fever for three or four days and you are not getting better - or you may be getting worse;**
- **You have started to feel better, and suddenly you get a high fever and start to feel sick again;**
- **It is noted by yourself or others that you are extremely drowsy and difficult to wake up or that you are disoriented or confused;**
- **You have extreme pain in your ear.**

Seek medical care as soon as possible, in order to prevent your condition from worsening. Bacteria may have invaded your damaged tissues. At this point your doctor may consider giving you an antibiotic.

If you have heart or lung disease or any other chronic condition that requires regular medical attention, if you are frail, or if you have an illness or are on treatments or medications that affect your immune system and you get the flu, call your doctor. If you are living with a long-term illness, your doctor may suggest changes to your usual management routine and/or provide you with extra help in treating the flu and preventing complications e.g., antiviral drugs. **These medications must be taken within 48 hour of the first symptoms to be effective so call your doctor right away.**

What your Doctor May Prescribe:

Recently, drugs called antivirals have been developed which can fight viruses. ***To treat influenza, they must be started within 48 hours of the first symptoms of the flu*** - the sooner, the better.

At the time of a pandemic, antivirals will likely be in short supply. Health Canada will provide advise as to who should get antivirals as a priority. For example, persons with underlying chronic diseases may be one of the first groups to receive treatment with antivirals. If you are in a priority group and you have symptoms of the flu, you should call your doctor straight away. If you are a healthy person and have not been identified as being in a priority group for antivirals, you do not need to call your doctor unless you have the more severe symptoms listed above.

D. When A Child Is Unwell

Older children and teens have the same symptoms of the flu as adults. Very young children *and infants probably have similar symptoms, but do not know how to tell people they have* sore muscles or a headache. These children may be irritable and eat poorly. They sometimes develop a hoarse cry and barking cough (croup). Younger children may also have diarrhoea, vomiting and stomach pain - especially children under 6 months.

Some of the things you can do for your child are:

- Give acetaminophen or ibuprofen every four to six (ibuprofen) hours for the fever in the dose recommended on the package (unless your doctor says otherwise). **DO NOT GIVE ACETYLSALICYLIC ACID CONTAINING MEDICATION (e.g., Aspirin, Bufferin etc.)** Your pharmacist can provide advice on appropriate over-the-counter medications for treating fever.
- Do not expect to be prescribed antibiotics for uncomplicated influenza, as they will have no benefit. Antibiotics may be prescribed for complications of influenza such as pneumonia or ear infection.
- Dress the child in lightweight clothing and keep the room temperature at 20 C.
- Offer cool fluids frequently when the child is awake.
- Avoid cool baths.
- Allow the child to rest and stay at home if possible for 6 days or more, so the virus isn't spread to other children.
- Use salt-water nose drops to treat a stuffy nose. Throw away tissues as soon as you have wiped your child's nose. Teach the child to cover their mouth when they cough or sneeze and then to throw the tissue away. Wash your hands often and teach your child to do so after wiping the nose.

Take your child to the doctor if your child:

- Has heart or lung disease or any chronic illness requiring regular medical care; has a disease or is taking drugs or treatments that affect the immune system; takes acetylsalicylic acid (ASA) e.g., takes ASA regularly for a medical condition;
- Has trouble breathing;
- Is less than 6 months old and has any temperature over 38.5 C;
- Is constantly irritable and will not calm down;
- Is listless and not interested in playing with toys;
- Has a fever that lasts more than 5 days;
- Drinks so little fluid that they are not urinating at least every 6 hours when awake;
- Has vomiting for more than 4 hours, or has severe diarrhoea;
- Note: green or yellow nasal discharge does not mean a child has a bacterial infection and needs antibiotics.

TAKE YOUR CHILD TO THE HOSPITAL EMERGENCY DEPARTMENT OR CALL 911 IF YOUR CHILD:

- Has severe trouble breathing not caused by a stuffy nose
- Has blue lips
- Is limp or unable to move
- Is hard to wake up, unusually quiet or unresponsive
- Has a stiff neck
- Seems confused
- Has a seizure (convulsion/fit)
- Has not had a wet diaper in 12 hours.

A) How To Take A Child's Temperature

There are 4 ways to take a child's temperature:

- by the mouth (oral)
- by the bum (rectal)
- under the armpit (axillary)
- in the ear (tympanic)

The best method to choose depends on your child's age:

- **Birth to 2 years**: best choice for an exact reading-rectal, second choice -armpit (to check for fever)
- **Between 2 and 5 years**: best choice-rectal, second-ear, third-armpit
- **Older than 5 years**: first choice-oral, second-ear, third-armpit

There are two types of glass thermometers: one for oral and axillary temperatures (it has a long slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. As the mercury expands, in response to the heat from the child's body, it moves up the column.

A digital thermometer can be used for rectal, oral and armpit temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

Rectal Method

- *If you are using a glass thermometer*, be sure it is a rectal thermometer.
- Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).
- Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36 C (96.8 F).
- Cover the silver tip with petroleum jelly (such as Vaseline)
- Place the baby on his/her back with his knees bent.
- Gently insert the thermometer in the rectum, about 2.5 cm (1 inch), while holding it with your fingers.
- Hold for at least two minutes. Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.

- Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.
- Store the thermometer in a container to prevent breakage.
- NB. This method is not recommended for children with illnesses/treatments affecting their immune system.

Armpit Method

- Use an oral glass thermometer.
- Clean the thermometer and shake down the mercury as in "rectal method".
- Place the silver tip of the thermometer in the center of the armpit.
- Make sure your child's arm is tucked snugly against his/her body.
- Leave the thermometer in place for at least 4 minutes.
- Remove, read, clean and store the thermometer as in "rectal method".

To use a digital thermometer:

- Press the button to turn the thermometer "on".
- Put the thermometer under your child's armpit. The silver tip must touch the skin.
- Hold the top of the thermometer with one hand and hold down your child's arm with the other hand.
- Wait for the thermometer to beep.
- Read the temperature on the display.
- To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

Mouth Method

- Clean the thermometer and shake down the mercury as in "rectal method".
- Do not give the child cold or hot liquids for 1/2 hour before taking his/her temperature.
- Carefully place the tip of the thermometer under the child's tongue. Tell him/her to close the mouth but not to bite down. (NB. This method is not recommended for children under 5 years of age.)
- With the child's mouth closed, leave the thermometer in place for 3 to 4 minutes. Stay with child and make sure he/she remains still.
- Remove thermometer, Read, clean and store as in rectal method.

Ear Method

- Use a clean probe tip each time, and follow the manufacturer's instructions carefully.
- Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- Gently insert the thermometer until the ear canal is fully sealed off.

- Squeeze and hold down the button for one second.
- Remove the thermometer and read the temperature.
- NB. This method is not recommended for children under one year of age.

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

What is a normal temperature?

The normal temperature range varies, depending on the method you use:

Rectum: 36.6 C to 38 C (97.9 F to 100.4 F)
Armpit: 34.7 C to 37.3 C (94.5 F to 99.1 F)
Mouth: 35.5 C to 37.5 C (95.9 F to 99.5 F)
Ear: 35.8 C to 38 C (96.4 F to 100.4 F)

B) How To Take An Adult's Temperature

Normal body temperature is regulated between 35.8 C and 37.2°C in healthy persons, it may vary by 0.5-1 degree during the day. Body temperature shows a definite pattern: low in the morning, gradually increasing during the day, and reaching its maximum during the late afternoon or evening.

There are 3 ways in which an adult's temperature is usually taken:

- by the mouth (oral)
- in the ear (tympanic)
- under the armpit (axillary). This method is less accurate, and is usually only used if the person is extremely drowsy or not clear mentally.

There are two types of glass thermometers: one for oral and axillary temperatures (it has a long slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. (These are usually used with children). As the mercury expands, in response to the heat from a person's body, it moves up the column.

A digital thermometer can be used for oral, armpit (and rectal) temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

Oral Method

- *If you are using a glass thermometer*, be sure it is an oral thermometer.
- Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).
- Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36 C.

- Make sure that you/the person whose temperature is being taken has not smoked a cigarette, had a hot or cold drink or taken a hot bath for 1/2 hour, or the reading will not be accurate.
- Carefully place the silver tip of the thermometer under tongue. Close mouth but do not to bite down. (NB. This method is not recommended for children under 5 years of age.)
- With mouth closed, leave the thermometer in place for 3 to 4 minutes.
- Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.
- Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.
- Store the thermometer in a container to prevent breakage.

If you are using a digital thermometer:

- Press the button to turn the thermometer "on".
- Put the thermometer tip under tongue and close mouth.
- Wait for the thermometer to beep.
- Read the temperature on the display.
- To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

Ear Method

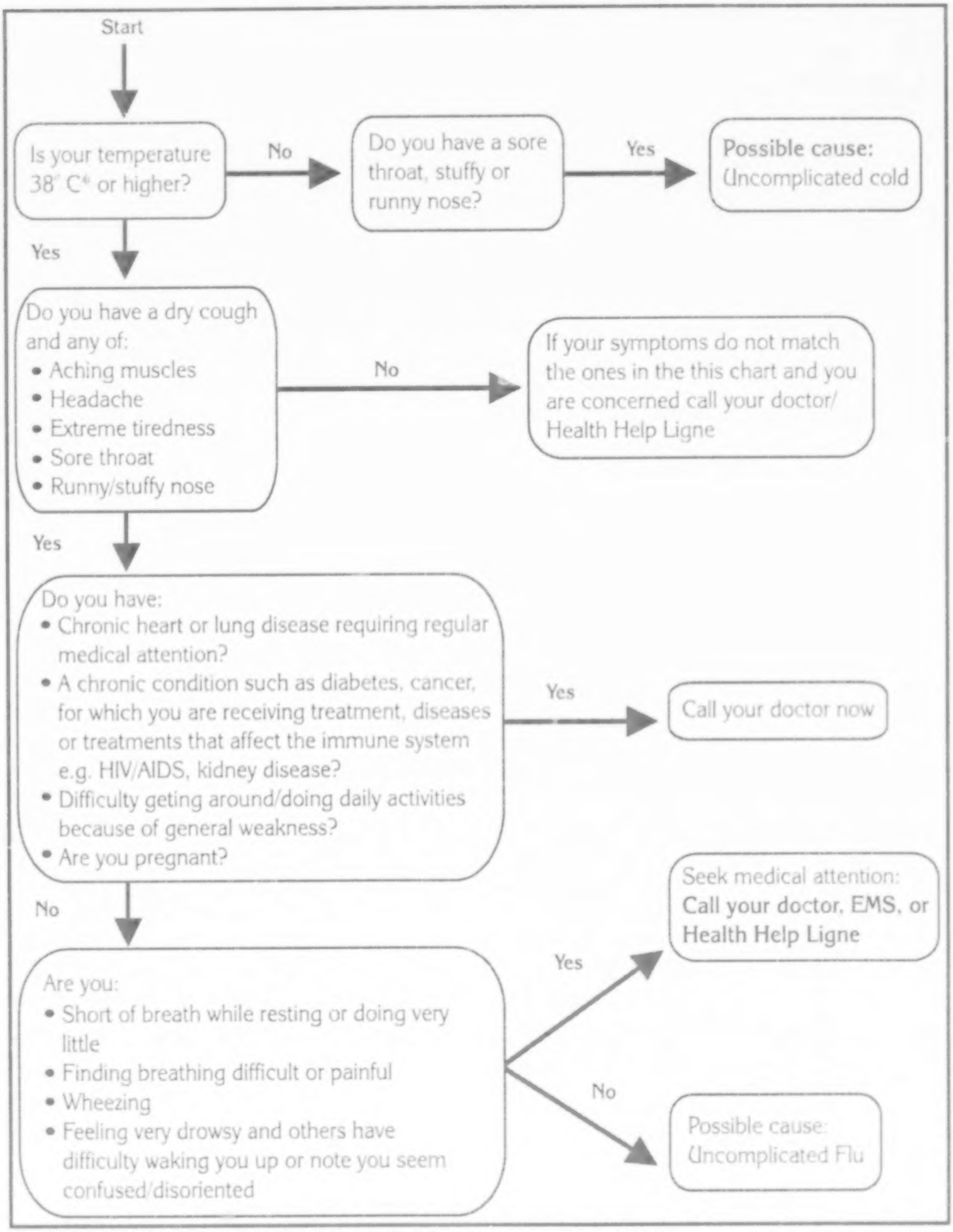
- Use a clean probe tip each time, and follow the manufacturer's instructions carefully.
- Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- Gently insert the thermometer until the ear canal is fully sealed off.
- Squeeze and hold down the button for one second.
- Remove the thermometer and read the temperature.

Axillary Method

- Use an oral glass thermometer.
- Clean the thermometer and shake down the mercury as in "oral method".
- Place the silver tip of the thermometer in the center of the armpit.
- Make sure the person's arm is held snugly against his/her body (forearm across chest).
- Leave the thermometer in place for at least 4 minutes.
- Remove, read, clean and store the thermometer as in "oral method".

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

C) Self-care Algorithms, Adults



Is your temperature 38° C* or higher?

Do you have a sore throat, stuffy or runny nose?

Possible cause: Uncomplicated cold

Do you have a dry cough and any of:
- Aching muscles
- Headache
- Extreme tiredness
- Sore throat
- Runny/stuffy nose

If your symptoms do not match the ones in the this chart and you are concerned call your doctor/ Health Help Ligne

Do you have:
- Chronic heart or lung disease requiring regular medical attention?
- A chronic condition such as diabetes, cancer, for which you are receiving treatment, diseases or treatments that affect the immune system e.g. HIV/AIDS, kidney disease?
- Difficulty geting around/doing daily activities because of general weakness?
- Are you pregnant?

Call your doctor now

Are you:
- Short of breath while resting or doing very little
- Finding breathing difficult or painful
- Wheezing
- Feeling very drowsy and others have difficulty waking you up or note you seem confused/disoriented

Seek medical attention: **Call your doctor, EMS, or Health Help Ligne**

Possible cause: Uncomplicated Flu

*For people older than 75 years, the temperature may be lower, e.g., 37.2°C

What you can do for yourself (uncomplicated flu)

- Rest-you will probably feel very weak until your temperature returns to normal.
- Fluids-extra fluids are needed to replace those lost in sweating. If your urine is dark, you need more to drink. Warm fluids help loosen mucus.
- Take acetaminophen 1 or 2 tablets every 6 hours or ibuprophen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing acetylsalicylic acid (ASA). Antibiotics won't help.
- Treat your symptoms, e.g., cough suppressant.
- Stay home from work/school for 6 days (while you are contagious), or until you are feeling better.
- Ask for help from family/friends if you live alone, are a single parent with small children, etc. and are having a hard time taking care of your own/your family's needs.

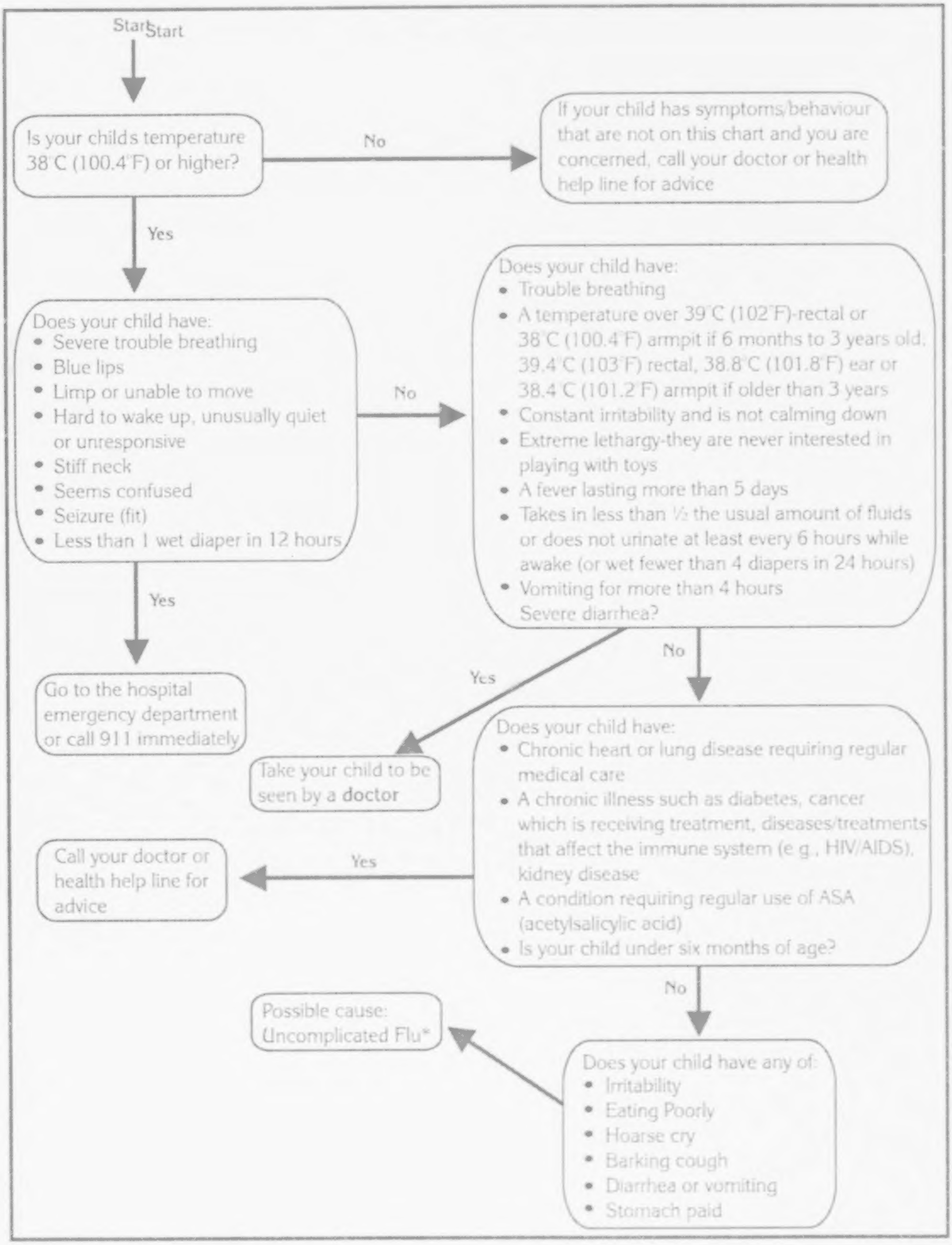
What to expect

- **Day 1-3**: Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- **Day 4**: Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- **Day 8**: Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

If any of the following happen during the flu, SEEK MEDICAL ATTENTION (Call your doctor, EMS, Health Helpline or go to the Emergency Room):

- You are short of breath even while resting.
- You have pain in your chest when you breathe.
- If you have heart disease and develop chest pain.
- You are coughing up bloody sputum.
- You are wheezing.
- You still have a fever and are not feeling better after 5 days.
- You are feeling better and suddenly you develop a fever.
- You or others note that you are extremely drowsy or are confused/disoriented.

Does Your Infant or Young Child (Birth to 6 Years) Have The Flu?



Is your childs temperature 38°C (100.4°F) or higher?

If your child has symptoms/behaviour that are not on this chart and you are concerned, call your doctor or health help line for advice

Does your child have:
- Severe trouble breathing
- Blue lips
- Limp or unable to move
- Hard to wake up, unusually quiet or unresponsive
- Stiff neck
- Seems confused
- Seizure (fit)
- Less than 1 wet diaper in 12 hours

Go to the hospital emergency department or call 911 immediately

Does your child have:
- Trouble breathing
- A temperature over 39°C (102°F)-rectal or 38°C (100.4°F) armpit if 6 months to 3 years old; 39.4°C (103°F) rectal, 38.8°C (101.8°F) ear or 38.4°C (101.2°F) armpit if older than 3 years
- Constant irritability and is not calming down
- Extreme lethargy-they are never interested in playing with toys
- A fever lasting more than 5 days
- Takes in less than ½ the usual amount of fluids or does not urinate at least every 6 hours while awake (or wet fewer than 4 diapers in 24 hours)
- Vomiting for more than 4 hours Severe diarrhea?

Take your child to be seen by a doctor

Does your child have:
- Chronic heart or lung disease requiring regular medical care
- A chronic illness such as diabetes, cancer which is receiving treatment, diseases/treatments that affect the immune system (e.g., HIV/AIDS), kidney disease
- A condition requiring regular use of ASA (acetylsalicylic acid)
- Is your child under six months of age?

Call your doctor or health help line for advice

Does your child have any of:
- Irritability
- Eating Poorly
- Hoarse cry
- Barking cough
- Diarrhea or vomiting
- Stomach paid

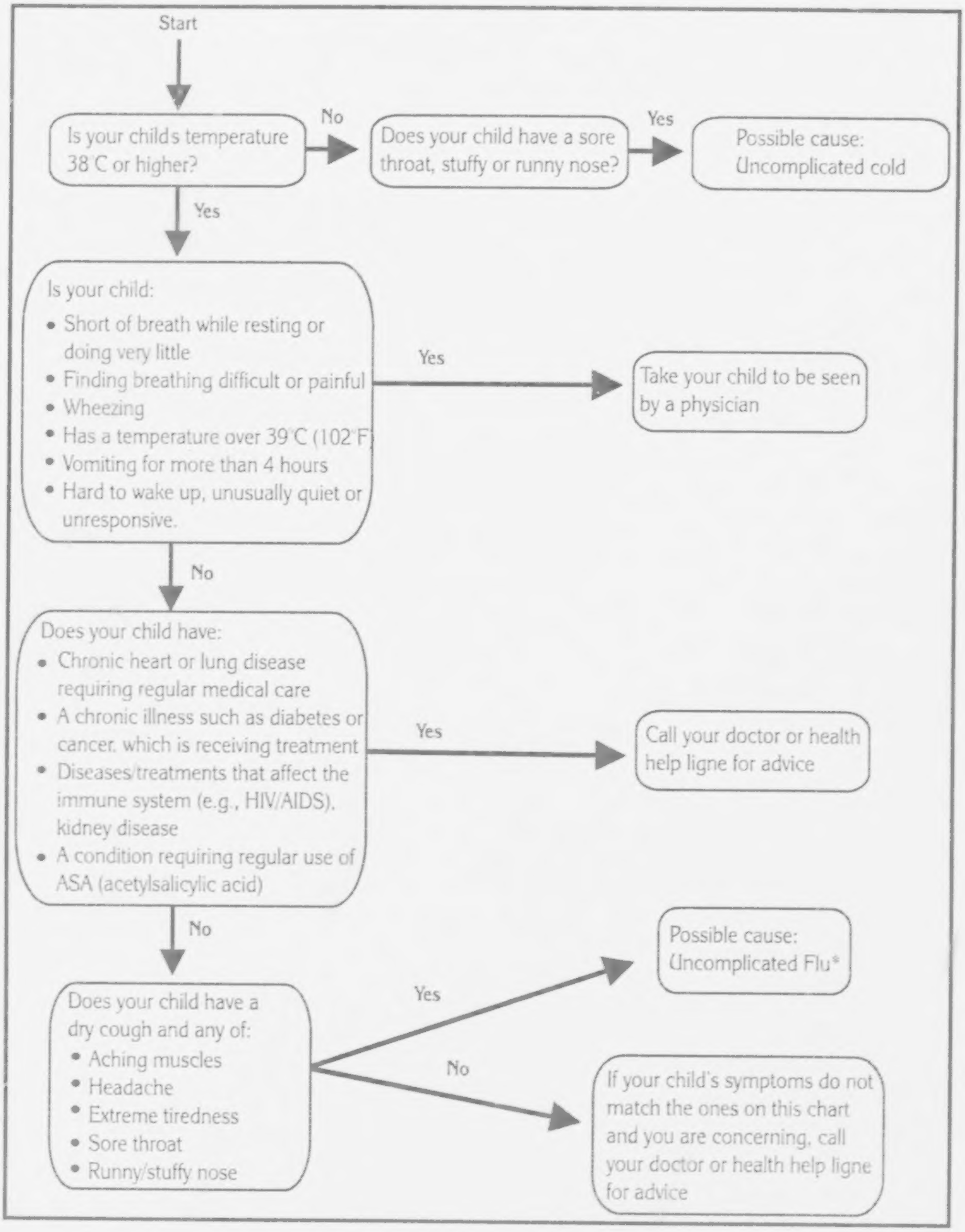
Possible cause: Uncomplicated Flu*

If your child has symptoms/behavior that are not on this chart and you are concerned, call your doctor or health help line for advice.

Uncomplicated Flu: Usually the symptoms start to clear up in 5 to 7 days

- Give acetaminophen or ibuprofen for fever (in the dose recommended on the package every 4-6 hours until the child's temperature comes down, unless your doctor says otherwise; do not give more than 5 doses in 24 hours). Do not give ASA. Antibiotics will not help.
- Dress in light-weight clothing and keep room at 20 C.
- Offer cool fluids frequently while awake.
- Allow to rest. Keep home for 6 days so the virus isn't spread.
- Use salt-water nose drops to treat a stuffy nose. Teach the child to cover their mouth when they cough and then to throw the tissue away. Wash your hands often and teach your child to do so as well.
- Avoid cool baths.

Does Your Older Child (Age Six Years to Adolescence) Have the Flu?


Start
Is your childs temperature 38°C or higher?
No
Does your child have a sore throat, stuffy or runny nose?
Yes
Possible cause: Uncomplicated cold
Yes
Is your child:
• Short of breath while resting or doing very little
• Finding breathing difficult or painful
• Wheezing
• Has a temperature over 39°C (102°F)
• Vomiting for more than 4 hours
• Hard to wake up, unusually quiet or unresponsive.
Yes
Take your child to be seen by a physician
No
Does your child have:
• Chronic heart or lung disease requiring regular medical care
• A chronic illness such as diabetes or cancer, which is receiving treatment
• Diseases/treatments that affect the immune system (e.g., HIV/AIDS), kidney disease
• A condition requiring regular use of ASA (acetylsalicylic acid)
Yes
Call your doctor or health help ligne for advice
No
Does your child have a dry cough and any of:
• Aching muscles
• Headache
• Extreme tiredness
• Sore throat
• Runny/stuffy nose
Yes
Possible cause: Uncomplicated Flu*
No
If your child's symptoms do not match the ones on this chart and you are concerning, call your doctor or health help ligne for advice

What You Can Do For Your Child

- Allow your child to rest. He/she will probably feel very weak until their temperature returns to normal.
- Offer fluids frequently while awake; extra fluids are needed to replace those lost in sweating. If your child's urine is darker than usual, they need more to drink.
- Give your child acetaminophen every 6 hours or ibuprophen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing ASA. Antibiotics won't help.
- Treat your child's symptoms e.g., cough suppressant, salt water nose drops . Teach the child to cover their mouth when they cough and then throw the tissue away. Wash your hands often and teach your child to do so as well.
- Keep your child home from school for 6 days (while they are contagious), or until they are feeling better.

What to Expect

- Day 1-3: Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- Day 4: Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- Day 8: Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

If any of the following happen during the flu, TAKE YOUR CHILD TO SEE A DOCTOR:

Your child:

- Is short of breath even while resting.
- Has pain in the chest when breathing.
- Is coughing up bloody sputum.
- Is wheezing.
- Still has a fever and is not feeling better after 5 days.
- Is feeling better and suddenly develops a fever.
- Is hard to wake up, unusually sleepy or unresponsive.

Appendix 2.II. Assessment Forms

1. **Primary triage centre**
   a) Adults (18 years)

Identification

Health Care Number:	
Name: ______________________________ Surname/Family Name	First Name
Age _____ (yrs)	DOB ___/___/___ DD MM YYYY
DATE OF CONSULTATION ___/___/_____ DD MM YYYY	

Risk Assessment For Complications Of Influenza

- › Does this patient fall into a "high risk group" for complications of influenza? **Y/N**

High-Risk Groups	Tick all relevant
Women in the second or third trimester of pregnancy	
Chronic cardiac disease (hypertension is not enough)	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - COAD or emphysema	
Chronic pulmonary disease - other than asthma, COAD or emphysema	
Chronic renal disease	
Non insulin dependent diabetes mellitus	
Insulin requiring diabetes mellitus	
Receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Resident of nursing home	
Resident of other chronic care facility	
65 year old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?						

Details of antivirals: Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Symptoms (adults ≥ 18 years)

Date and time of onset of first symptoms:

Clinical features on history	YES	NO	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with someone with influenza in the last 3 days?				
Fever				
Chills				
Aching muscles and joints				
Stiffness				
Headache				
Fatigue				
Runny/stuffy nose				
Cough				
Sore throat, hoarseness				
Purulent sputum				
Thoracic pain when taking a deep breath				
Retrosternal soreness (tracheitis)				
Breathlessness				

Clinical features on history	YES	NO	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
Anorexia				
Vomiting				
Diarrhoea				
Confusion, drowsiness				
Rash				

Examination Findings (adults ≥ 18 years)

Date _____/_____/______ **Time:** ______:_____
DD MM YYYY HH MM

Vital signs

Description	Threshold for indication of secondary assessment	Values for this patient
Temperature	<35 C or (39 C	
Respiratory Rate	(24/minute	
Heart rate	(100/minute	
Blood pressure	<100 mmHg Systolic	
Altered mental status	New confusion	
Function	New inability to function independently	
Skin colour	Cyanosis (bluish colour)	
Oxygen saturation*	<90% on room air	

* Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III).

Provisional Diagnosis

Please Tick All That Apply

	Yes	No
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Other		
Pregnant		
Breastfeeding		

Note: If secondary assessment is required, and patients are sent to another centre/ward for complementary evaluation, each individual should be provided with a summary of the symptoms and signs detected at the primary triage centre.

b) Children 18 years:

Identification

Health Care Number:	
Name: ______________________________ Surname/Family Name	First Name
Age _____ (yrs)	DOB ___/___/___ DD MM YYYY
DATE OF CONSULATION ___/___/_____ DD MM YYYY	

Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? Y/N

Child with

High-Risk Groups	Tick all relevant
Chronic cardiac disease	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - other than asthma	
Chronic renal disease	
Diabetes mellitus	
Child with cyanotic congenital heart disease	
Receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Resident of long-term care facility	
< 2 years old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?	7-valent 23-valent					
PNEUMOCOCCAL vaccine within the last 5 years?	7-valent 23-valent					
PNEUMOCOCCAL vaccine within the last 5 years?	7-valent 23-valent					
PNEUMOCOCCAL vaccine within the last 5 years?	7-valent 23-valent					
PNEUMOCOCCAL vaccine within the last 5 years?	7-valent 23-valent					

Details of antivirals: Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Symptoms (children ≤ 18 years)

Date and time of onset of first symptoms:

Clinical features on history	YES	NO	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with someone with influenza in the last 3 days?				
Fever				
Chills				
Aching muscles and joints				
Stiffness				
Headache				
Fatigue				
Runny/stuffy nose				
Cough				
Sore throat, hoarseness				
Purulent sputum				
Thoracic pain when taking a deep breath				
Retrosternal soreness (tracheitis)				
Breathlessness				
Anorexia				
Vomiting				
Diarrhoea				
Confusion, drowsiness				
Rash				

Examination Findings (children ≤ 18 years)

Date ____/____/_____ Time: _____:____
DD MM YYYY HH MM

Vital signs

Primary Assessment	Results Requiring Secondary Assessment	Vital signs for this patient
Temperature[a]	35 C or 39 C	
Respiratory Rate	< 2 months = >60 breaths per minute 2-12 months = >50 breaths per minute > 12 months to 5 years = >40 breaths per minute > 5 years = > 30 breaths per minute	
Skin colour and temperature (lips, hands)	Cyanosis, sudden pallor, cold legs up to the knee	
Chest symptoms[b] (pain may be difficult to detect in young children)	Chest indrawing, wheezing, grunting, inquire for chest pain	
Mental status	Lethargic or unconscious[c]	
Function	Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.)[d] Inability to function independently[c]	
Neurologic symptoms and signs	Seizures, full fontanelle, stiff neck	
Oxygen saturation[e]	90% room air	

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever ((39 C) in adolescents is a warning sign and needs further assessment.

b Signs of dehydration: sunken eyes, no saliva, doughty skin

c Chest pain may be a sign of pneumonia, even in the absence of crackles or wheeze . It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

d A deterioration of the consciousness and inability to function, lack of interest in playing and sleepiness should be further investigated.

e Vomiting (>2-3 times/24 hr.), particularly if the children are not breast-feeding or drinking well, is a warning sign and requires a secondary assessment.

f Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III).

Provisional Diagnosis

Please Tick all that Apply

	Yes	No
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		

2. **Secondary clinical assessment:**

   a) Adults (18 years):

Identification

Health Care Number:

Name: ______________________________
Surname/Family Name First Name

Age _____ (yrs) DOB ___/___/___
DD MM YYYY

DATE OF CONSULTATION ___/___/_____
DD MM YYYY

Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? Y/N
- Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

Note: When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the patient, to confirm the diagnosis done at the primary triage centre, should always precede the laboratory studies mentioned below. **NOT ALL THE TESTS MENTIONED UNDERNEATH WILL BE NEEDED FOR ALL PATIENTS, AND CLINICAL JUDGEMENT SHOULD ALWAYS PRECEDE ANY PROCEDURE, PARTICULARLY IF RESOURCES ARE SCARCE.**

The primary assessment forms, or part of these forms, may be repeated here.

Investigations in Adults (≥ 18 years)

Complementary laboratory studies	Results requiring supervision of patient or admission	Results for this patient
CBC (core battery, if appropriate)	Hgb 80 g/L	Hgb:
	WBC 2,5000 or 12, 000 cells/ L	WBC:
	Bands 15%	Bands:
	Platelets 50,000/(L	Platelets:
Electrolytes	Na 125 meq/L or 148 meq/L	Na:
	K 3 meq/L or 5.5 meq/L	K:
BUN, creatinine	BUN 10.7 mmol/L	BUN :
	Creatinine 150 mol/L	Creatinine:
Glucose	3mmol/L or 13.9 mmol/L	
CPK (only in patients with severe muscle pain)	CKMB 50%	CKMB:
	Total CK 1,000 mol/L	Total CK:
Blood gases, O2 saturation	Blood gases p02 60 room air PH <7.35	PO2: PH:
	O2 saturation 90% room air*	O2 saturation:
Chest x-ray (CRX)	Abnormal, consistent with pneumonia Pleural effusion	
EKG	Evidence of ischemia, new arrhythmia	

*Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III)

Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empiema).

Provisional Diagnosis

Please Tick all that Apply

	Yes	No
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Pneumonia, confirmed (C)/suspected (S)/unlikely (U)	C / S / U	
Viral		
Bacterial		
Other		
Pregnant		
Breastfeeding		

Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

Admission

Yes:

- Suspected Flu ward
- Confirmed Flu ward
- General ward
- Observation
- ICU Admission
- CCU Admission

If not admitted:

Sent to:

- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

b) Children (18 years):

Identification

Health Care Number:

Name: ____
Surname/Family Name First Name

Age _____ (yrs) DOB ___/___/___
DD MM YYYY

DATE OF CONSULTATION ___/___/_____
DD MM YYYY

Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**
- Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the child, to confirm the diagnosis done at the primary triage centre, should always precede the laboratory studies mentioned below. **Not all the tests mentioned underneath will be needed for all patients, and clinical judgement should precede any procedure, particularly if resources are scarce.**

As with adults, part of the primary assessment forms may be added here.

Investigations

Complementary laboratory studies	Results requiring supervision of patient or admission*	Results for this patient
CBC (core battery, if appropriate)	Hgb: Values of Hemoglobin for young children are age related, see Table 2.2.4	Hgb:
	WBC: Values of WBC for young children are age related, see Table 2.2.4	WBC:
	Bands 15%	Bands:
	Platelets 50,000/ l	Platelets:
Electrolytes (see Table 2.2.4)	Na 125 meq/L or 148 meq/L	Na:
	K 3 meq/L or 5.5 meq/L	K:
BUN, creatinine (see Table 2.2.4)	BUN 10.7 mmol/L	BUN:
	Creatinine 150 mol/L	Creatinine:
Glucose (see Table 2.2.4)	3mmol/L or 13.9 mmol/L	Glucose:
CPK (only in patients with severe muscle pain)	CKMB 50%	CKMB:
	Total CK 1,000 mol/L	Total CK:
Blood gases, O2 saturation	Blood gases p02 60 room air PH <7.35	PO2: PH:
	O2 saturation 90% room air	O2 saturation:
Chest x-ray (CRX)	Abnormal, consistent with pneumonia Pleural effusion	

*Some of these values are age-dependant and appropriate values for each age should be consulted (see Chapter 2, Table 2.2.4).

Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empiema).

Provisional Diagnosis

Please Tick all that Apply

	Yes	No
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Pneumonia, confirmed (C)/suspected (S)/unlikely (U)	C / S / U	
Viral		
Bacterial		
Other		
Pregnant		
Breastfeeding		

Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

Admission

Yes:

- Suspected Flu ward
- Confirmed Flu ward
- General ward
- Observation
- ICU Admission
- CCU Admission

If not admitted:

Sent to:

- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

Appendix 2.III. Pulse Oximetry and Trans-cutaneous Oximetry

Although the measurement of the "in vitro" saturation of arterial blood is still the golden standard for measuring arterial oxygen, it involves repeated sampling of arterial blood, is costly and time consuming, and only gives intermittent and delayed results. Two non-invasive procedures have been developed recently for continuous monitoring of oxygen saturation: pulse oximetry and trans-cutaneous oximetry. Both procedures, however, have some shortfalls; and, ideally, they should be used in combination[214,172]. In a pandemic situation, this will not be possible in most facilities, and, therefore, clinicians should be aware of the limitations of each device, particularly when testing critically ill patients. Taking the mean of two or more measurements, if possible, can reduce variability and increase reliability[172].

1. **Pulse oximetry** is a non-invasive, continuous monitoring procedure that has supplanted arterial sampling methods for studying patient's oxygen saturation. It allows the estimation of the arterial tension of oxygen [SPO2 is the oxygen saturation (PO2) measured with a pulse oximeter, given in %] in the ranges that are clinically relevant (i.e., 75-95%, Fig. 2.1). It has been reported to be accurate within 5% (2% for SPO2 > 70%, and responds to cardiopulmonary changes that affect tissue oxygenation[181,165,172,108]. Pulse oximetry has, however, some limitations:
    - It does not provide information regarding patient's ventilation and carbon dioxide tension. The patient may have a normal reading and still be hypercapnic and have respiratory failure. Carboxyhemoglobin and methemoglobin, on the other hand, have light absorption similar to oxyhemoglobin, and, therefore, both can modify the SPO2 readings (similarly: extreme anemia, intravenous dyes used in diagnostic and hemodynamic testing, bilirubin, skin colour, and brown-red nail polish, can also modify the readings[108]).
    - Pulse oximeters require careful sensor placement and adequate pulse pressures (> 20 mm Hg), and they are prone to movement artefacts (which is a serious shortcoming with young children). Sensors should be placed 2-3 mm apart from each other, and any optical shunt should be avoided (i.e., light received by the sensors without passing through the skin). It must be ensured that all light emitted pass through the tissues, that the receiving diode is located exactly opposite to the emitter, and that both are shielded from ambient light[172].
    - Skin burns are possible and, therefore, the sensors should be checked carefully before use, and patients should be checked each 6-8 hours[172]. Probes may be placed in the ear or in the fingers, although finger probes are considered more accurate[108].
    - Patients with low perfusion states may hinder the performance of pulse oximeters. In these patients the results become blood-flow dependent. During shock, the proportion of wrong or missing values sharply increases[172]. Increased venous pulsations may occur if probes are secured too tightly, or in cases of right heart failure, tricuspid regurgitation, etc. and they may, mistakenly, be detected by the pulse oximeter[108].
    - Although the response time is the time it takes for the blood to travel from the lungs to the sensor, pulse oximeters usually average their values over periods from 2-15 seconds or from 4-32 heartbeats. This intends to level out any erroneous

measurements and minimize false alarms; however, this procedure prolongs the response time, and also may lead to false readings after body movements or may mask intermittent hypoxemia[172]. Some brands have the option to be used in a beat-to-beat mode (i.e., without averaging their readings), what may be preferred for same patients.

- Pulse oximeters derive their results from an "empiric" table elaborated with data from healthy adults. Therefore, each instrument should be validated if measurements are done in infants and young children. In addition, saturations < 70-80% were not attained in healthy volunteers, and are, therefore, extrapolated, which may lead to an underestimation of the true degree of hypoxemia.
- There are considerable differences in bias (or systematic error, this indicates the overestimation or underestimation of one brand relative to the other) and precision (variability or random error) between brands, and it is important to determine which brand of oximeters is used, mainly when the values of PO2 are in the low ranges[165]. Available data shows considerable differences not only between instruments but also between studies[172]. The algorithms used to calculate the SPO2, and the way these measurements are displayed can partially explain these differences. Users should be aware of this fact and know the brand of oximeter and software they are using. Data from one brand cannot be transferred to another brand.

2. **Transcutaneous sensors** may also be used to determine the tcPO2 (transcutaneous tension of oxygen, given in mm Hg), a variable that reflects the PO2 in the peripheral tissue. Sensitivity to PO2 < 50 mm (hypoxemia) and > 80 mm (hyperoxemia) is approximately 85%[172]. Limitations of tcPO2 are:
   - The tcPO2 decreases relative to arterial PO2 with increasing patient's age[172].
   - Values are influenced by skin thickness (results will be low in areas of thick or poorly perfused skin), sensor temperature (should not be <44(C and it takes 15 minutes to heat the skin, otherwise the values will be unreliable), amount of gel used (if too much gel is used, the values will be wrongly high), and peripheral perfusion[172]. Additionally, the sensor must be regularly relocated (particularly in young children) to avoid skin burns.
   - In the presence of severely reduced cardiac output and peripheral perfusion, the tcPO2 values deviate from the arterial PO2 and become blood flow dependent. If interpreted correctly, it may provide an early warning of cardiac failure, hypotension, or acidemia[214].
   - Response times are delayed, caused by the time required for the oxygen to travel from the capillaries through the skin into the electrodes. The average response time to a rapid decrease in the PO2 is approximately 16 seconds and up to 30 seconds.

Normal values (Fig. 2.1)

Normal values for children and adults are published in some papers (see below). However, the interpretation of the results obtained with the different brands should follow instructions included with the instrument's manuals.

1. **Pulse oximetry** (always refer to instrument's manuals):
    - Data on baseline SPO2, controlled for movement artefacts and taken in a beat-to-beat mode, for neonates, infants and children, was obtained with one brand, Nellcor oximeters. Baseline SPO2, during quiet sleep and away of apneic pauses is between 95-100% in preterm infants and 97-100% in older infants and children. The frequency of episodic desaturation varies considerably with age. In children 2-16 years SPO2 almost never reaches 80% and even reductions to 90% are infrequent, while in newborns short episodes of SPO2 (80% are quite common[172].
    - In healthy newborns, the mean SPO2 was 97.2% (1.6% with a median value of 97%. Only age and activity affected the SPO2 significantly; values obtained while the infants were fussy and crying were lower compared to measurements done when they were sleeping[127]. Values measured in 60 term infants (with a Nellcor N200) in the first 4 weeks of life, detected episodes of desaturation (80% for 4s) in 35% of the recordings obtained in the first week and 60% in weeks 2-4. The clinical significance of these values remains to be determined[173].
    - Values taken from 150 normal adult volunteers (not arterialised in advance) with a pulse oximeter, resulted in 13.3% individuals with values <94%, none below 90%. When patients receiving anaesthesia were studied, only 1.1% of the patients who received O2 following anaesthesia had values below 90%, while this value was 16.7% for patients not receiving O2. The alarm limit for Criticalcare Systems 501 oximeter, used for this study, is 90%[198].
    - In a study of stroke patients, the overall SPO2 was above 90%, and similar to controls of the same age, when patients were sitting up[197]. Episodes of desaturation were defined as SPO2 < 90%.
    - All night pulse oximetry values from a total of 350 healthy subjects with ages ranging from 1 month to 85 years were compared to 25 individuals with obstructive sleep apnea (OSA) and 21 individuals with asthma. Mean values +/- SD for the healthy patients were: 1) the lowest saturation recorded during the night = 90.4% +/- 3.1; the saturation below which the individuals spent 10% of the night was 94.7% +/- 1.6; and the median saturation was 96.5% +/- 1.5%. No relation was found with sex, obesity, or race. Asthma patients did not have differences with healthy controls, but OSA had significantly lower saturation values. Healthy older subjects (>60 years) had lower O2 saturation than younger individuals[87].

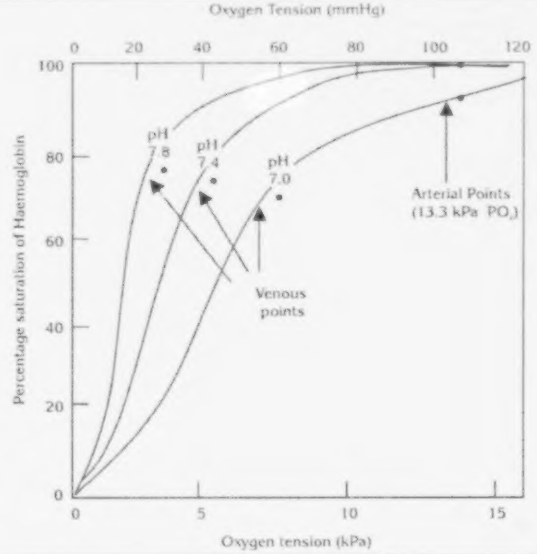
2. **Trans cutaneous PO2 monitoring**

- Mean tcPO2 of newborns and infants during both, quiet sleep and wakefulness (excluding feeding or crying) was about 70-80 mm of Hg with a deviation of 6-10 mm of Hg[172].
- Index values for tcPO2 in adults have been reviewed by Tremper and Barker[214].

O2 in blood

Blood concentration of haemoglobin (Hb) in adults is 14(2 g/dL blood (140 20 g/L) and it can carry about 20ml oxygen per dL, as oxyhemoglobin. The Hb binding sites bind oxygen in accordance with the partial pressure of the gas in solution (PO2), and the percentage of saturation of the Hb is given by the percentage of binding sites occupied. The relation between the PO2 and the Hb saturation is non-linear and has the shape of an S (Figure 2.1), which has physiological advantages: In the arterial part of the graph, it is fairly flat, what means that moderate changes in PO2 cause only small decrements in saturation. However, the curve is fairly steep in the normal ranges for venous PO2, which allows delivery of oxygen to the tissues with minor changes in the PO2 (Figure 2.1)[44,137]. The relative affinity of the Hb for oxygen is given by the parameter P_{50}, i.e., PO2 at 50% saturation; it is decreased by physiologic factors like pH, PCO2 and temperature (Figure 2.1). In clinical practice, patients requiring blood gas measurements also have altered temperatures, blood pH and CO2 excess. Blood gas machines usually take these factors under consideration[44,137].

Figure 2.1



Legend. The centre curve is the normal curve under standard conditions. The other graphs show the displacements caused by changes in blood pH, with all other parameters remaining constant. Venous and arterial saturation points are also shown, based in an arterial/mixed venous oxygen saturation difference of 25%. Arterial saturation for these graphs corresponds to a PO2 of 13.3 kPa (100 mm Hg). Temperature 37 C, base excess =0[137].

Management of Patients in Long Term Care Facilities

3.1 Long-Term Care Facilities

Long-term care facilities (LTCF) include a heterogeneous group of establishments. Although they accommodate mainly elderly individuals (nursing homes are the most common), the spectrum of services provided is wide and there are establishments for residents with physical or psychiatric disability, pediatric centres and geriatric centres. Some institutions provide permanent custodial care, however other organizations provide only temporary rehabilitation care[166,100].

Because of their age and underlying medical conditions, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. Health-care personnel and visitors may introduce the virus, and the closed environment will favour transmission[88,166]. During influenza outbreaks in hospitals or nursing homes, as many as 70% of individuals (either personnel or patients) may become infected. The increased use of invasive devices such as central lines, chronic respirators, feeding devices, etc. facilitate the development of infections and complications[88,166].

A goal, in the pandemic situation, will be to manage patients within the facility without transferring them to an acute care facility. This may require that the long-term care facility designate an area for more acute care, where closer monitoring and more intensive nursing care can be provided, and where parenteral therapy and oxygen therapy may be given.

Prior to any pandemic, long-term care facilities should have in place policies to support appropriate management of residents and personnel. The inter-pandemic epidemics suffered almost every year are an opportunity to develop such policies and test their efficacy.

They should include:

a) An institutional policy for the management of influenza outbreaks;

b) Immunization of residents and staff;

c) Plans to establish an area within the facility for management of more acutely ill patients;

d) Advanced directives for all residents, which should be completed and updated regularly and are consistent with provincial legislation and institutional policy.

The goals of an institutional influenza plan are:

- To prevent influenza illness and complications in residents and staff;
- Timely diagnosis and appropriate management of influenza infection in patients;
- Timely diagnosis and management of an influenza outbreak within the LTCF;
- To provide care for ill residents within the facility without transfer to another facility.

3.2. Assessment and management of long-term facility residents

3.2.1 Prevention

a) Yearly influenza vaccine for all residents and staff according to national/local recommendations (interpandemic influenza). If a pandemic is declared, pandemic vaccine priorities will be considered.

b) Pneumococcal vaccination of all residents, consistent with NACI guidelines.

c) Comprehensive, timely surveillance for influenza-like illness in residents and staff, including rapid laboratory confirmation and viral culture (interpandemic influenza). Microbiological tests (bacteriologic and/or virologic determination) may be required depending on the clinical presentation and on the availability of resources. Once the presence of the pandemic strain has been confirmed in the facility, virologic tests will be needed only to confirm diagnosis in atypical cases, and for surveillance purposes. Current rapid tests may be useful for confirmation of diagnosis and treatment decisions (see Appendix 5.II).

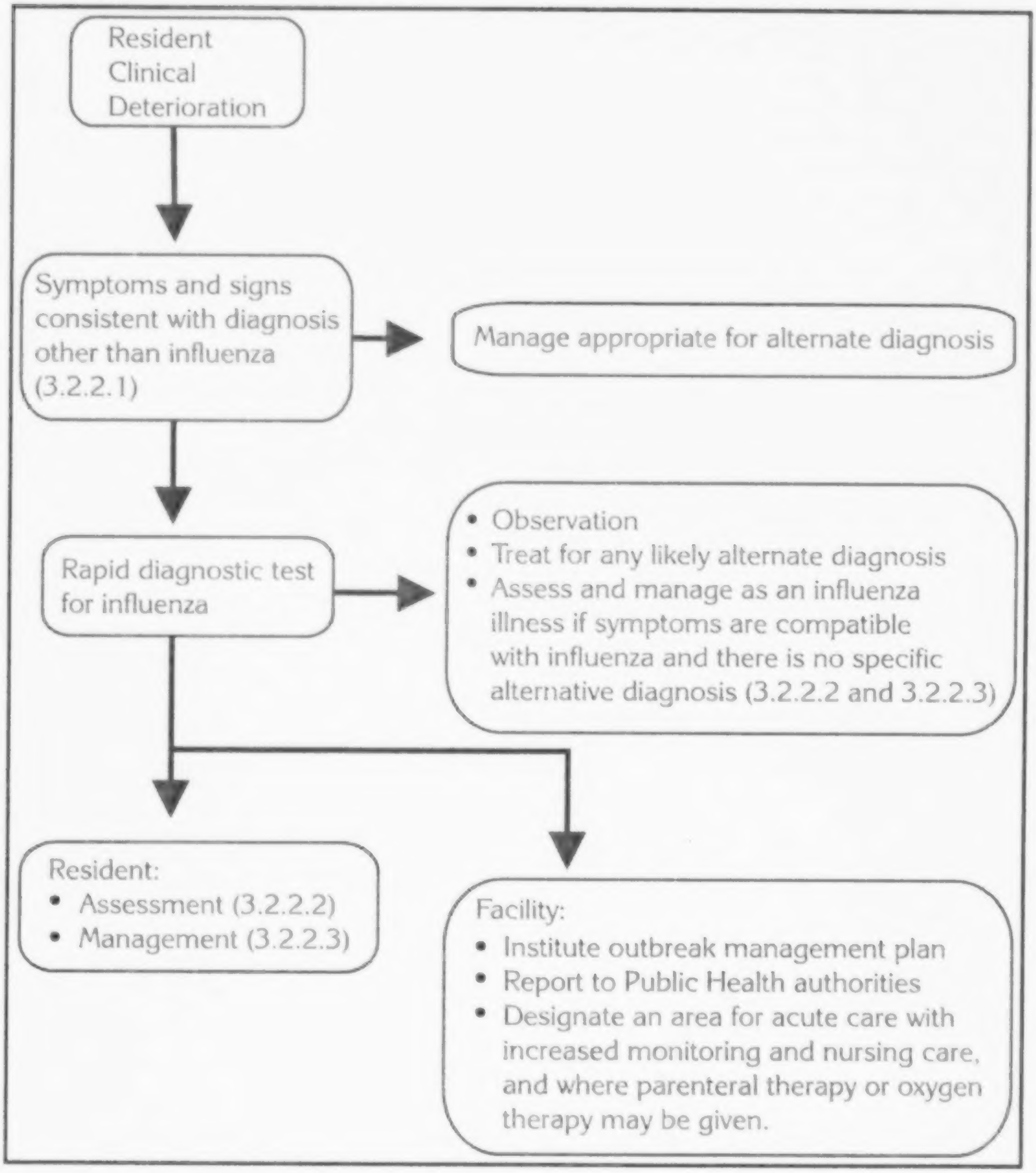
d) Facility guidelines for use of prophylactic antivirals, within the framework of antiviral prioritization for pandemic influenza, should be in place in all LTCF.

The following algorithms are general, and designed for "nursing homes", where residents are elderly and have multiple co-morbidities. Nevertheless, the approach is applicable to other LTCFs, although specific needs for other populations should be considered in advance.

3.2.2 Diagnosis and management of residents with influenza

Triage of long term care facility residents

The algorithm suggested in this page is intended to help personnel in LTCFs to identify patients with influenza, to assess the severity of the disease, and to determine follow up during a pandemic.


Resident Clinical Deterioration
Symptoms and signs consistent with diagnosis other than influenza (3.2.2.1)
Manage appropriate for alternate diagnosis
Rapid diagnostic test for influenza
• Observation
• Treat for any likely alternate diagnosis
• Assess and manage as an influenza illness if symptoms are compatible with influenza and there is no specific alternative diagnosis (3.2.2.2 and 3.2.2.3)
Resident:
• Assessment (3.2.2.2)
• Management (3.2.2.3)
Facility:
• Institute outbreak management plan
• Report to Public Health authorities
• Designate an area for acute care with increased monitoring and nursing care, and where parenteral therapy or oxygen therapy may be given.

3.2.2.1 Symptoms consistent with flu like illness. Long-term care facility residents

These recommendations assume that influenza is known to be present in the community or region. In this situation, any resident of a long-term facility who deteriorates clinically and for whom there is no clear alternate diagnosis may have influenza illness[84].

The clinical presentation of any infectious illness in an elderly impaired long-term care facility resident may be non-specific, and non-classical. Alternate diagnoses must be considered when the patient is initially assessed, including non-infectious causes such as deterioration of co-morbid illness or medication adverse effects. A diagnosis of influenza should be excluded with any non-specific presentation.

Influenza infection of elderly residents in a long-term care facility may present with:

a) Fever (could be only a low grade fever) or hypothermia.

b) Anorexia

c) Vomiting

d) Increased confusion or decreased functional status e.g., a decreased ability to walk independently.

e) White cell count may be normal, with or without a shift to the left.

Rapid diagnostic tests are useful to confirm or discard influenza in elderly patients with uncertain clinical presentations. They are helpful if antiviral therapy is considered, as these should be started shortly after the onset of disease (within the 48 hours of onset) to get maximum results (see Appendix 5.II). Rapid tests may not be available in a pandemic situation and there may be many false negatives tests. Therefore, patients with symptoms compatible with influenza should be assessed and managed as such, especially if there are no other obvious diagnoses.

3.2.2.2 Influenza illness assessment. Long-term care facility residents

The **initial assessment** and evaluation of the residents should be consistent with advance directives, and include the following:

a) History: age, duration of residence in the facility, co-morbid illnesses, documentation of last influenza vaccination, documentation of pneumococcal vaccination, time of onset of symptoms.

b) Physical assessment: temperature, skin colour, pulse, blood pressure, respiratory rate, peripheral oedema, chest auscultation, chest pain on inspiration, mental status, function (ability to function independently, continuous vomiting, etc.).

c) Diagnostic testing should include 02 saturation. For residents who are clinically stable and not judged to be severely ill this may be sufficient.

In residents where there are concerns about metabolic status, or the degree of illness, additional tests which may be considered include a CBC with white cell count, electrolytes, blood glucose, CPK, BUN and creatinine, an EKG if there is a new arrhythmia or evidence of significant deterioration in cardiac status. A chest x-ray should be considered for all residents with an oxygen saturation of (90% on room air, with new purulent sputum, or respiratory rate (30 per minute. A sputum culture may be helpful for residents producing sputum, and blood cultures should be considered in individuals who appear to be severely toxic (depending on the availability of resources, see Chapter 2).

Long-term care facilities should have in place arrangements by which portable chest x-rays may be obtained, and should consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

In addition to nursing homes, some elderly adults live in residences for the old, where there are basic health services. These residences should be considered as potential sites for triage and care of residents (non-traditional sites) in a pandemic, and should be equipped to provide basic diagnostic tests and healthcare services to residents with influenza.

3.2.2.3 Instructions for the management of subjects remaining in the long term care facility

A written plan for the timely management of patients should be in place. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medications.

a) **Diagnostic and follow-up tests** (in selected patients, see Chapter 2):

- Chest X-Rays (as required, see Chapter 2)
- Blood tests, urine analysis, etc. (as required)
- Viral/Bacterial studies: sputum, cerebrospinal liquid, nasopharyngeal aspirate , blood culture (see Chapter 2).

b) **General management**: The goals of general management are to maintain comfort, to preserve functional status, and to limit complications[60,84,204]. Specific aspects of management for influenza and its complications include:

1. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids. Where parenteral fluids are necessary hypodermoclysis is an option rather than intravenous therapy and may be more practical in the long-term care setting.
2. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
3. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. During the early stages of the pandemic, LTCFs should determine access to antivirals and antibiotics. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only management approaches. Strategies to manage patients pending antivirals should be developed.

1. **Antiviral agents** including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used, dosage adjustment for renal function is necessary. Zanamivir may be impractical because it requires cooperation from the individual to use an inhaler. This may not be achievable in many long-term care facility patients, especially those who are acutely ill. (See Appendix 5.III)
2. **Antibiotics** should be given only for the management of presumed or diagnosed secondary bacterial pneumonia (see Chapter 2 and Appendix 5.IV).
3. **Management of preexisting disease**: Cardiovascular, respiratory, metabolic, etc.
4. **For patients who are acutely confused** and in whom correction of oxygenation or limitation of fever are not sufficient to control confusion, management for acute confusion may be necessary.

3.2.3 Discharge Criteria: (from the care sector designated for influenza patients)

It is important to define when patients are clinically stable and can be moved back to the usual residential area. Patients will be considered clinically stable when, in the preceding 24 hours[71]:

- They are not acutely confused
- They are able to be fed orally or by naso-gastric tube
- Their vital signs are stable. Values should be established (e.g., O2 saturation > 90%, heart rate < 100/minute, respiratory rate < 24/minute, blood systolic pressure > 90 mm Hg, temperature < 38°C).

Once the patients have been clinically stable for 48 hours and intravenous medication has been switched to oral therapy, the attending personnel should consider discharge from the "acute care area". In the pandemic setting, prioritization for earlier discharge may be necessary due to limitations in resources.

3.2.4 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same facility. In some special circumstances, however, the transfer to acute care services may be considered and this has to be planned in advance.

3.3 Timely diagnosis and management of an influenza outbreak within the LTCF

The early detection of any outbreak occurring in a LTCF is essential to implement control measures and to stop the diffusion of the disease. In a pandemic situation, the first case of confirmed influenza would likely lead to outbreak management for pandemic influenza.

Every LTCF should have in place surveillance for the early detection and control of an outbreak. This includes[88]:

1) Preparation of a written plan for the management of an influenza outbreak, avoiding unnecessary delays. This will include the identification of diagnostic tests, responsibilities of medical and non-medical personnel, and use of antiviral medication.
2) Identification of personnel responsible for the surveillance and for the transmission of information within the establishment. This will usually be the individual with responsibility for infection control in the facility. The Public Health authorities will inform this individual if influenza is circulating in the community and he/she will report to the authorities when an outbreak has been detected in the facility.
3) Education of all staff and attending physicians in the importance of early identification and notification if a case is suspected.
4) A response capacity maintained 7 days per week.
5) Specific reporting mechanisms and standardized data collection (Appendix 3.I).

Once the outbreak is confirmed, the authorities responsible should take all the measures required to control the propagation of the virus within the facility (among the residents, and to personnel and visitors; see Infection control guideline). Studies and treatment of patients will be done in the area of the facility assigned for this purpose; and prophylactic treatment of some residents may be initiated (following the existing framework for antiviral prioritization during the pandemic).

Appendix 3.I. Influenza-Like Illness Surveillance in a Long-Term Care Facility[88]

Unit/ Sector: ____________________ Date: ____________________

RESIDENTS or PERSONNEL			Flu Vaccination		Date of onset (m/day)	Signs and symptoms (use letter)			Antibiotics or Antivirals	Diagnostic tests		Comments: death complications, other
Name	Sex	Age	+/-	Date (y/m/d)		(F)	(C)	(M)/(A)/(H)/(Ch)/(S)	Drug & Date (m/day)	Date	Results	

Legend: Fever = (F); Cough = (C); Myalgia = (M); Arthralgia = (A); Headache = (H); Chills =(Ch); Sore throat = (S)

Note: If a resident appears with an ILI (fever of acute onset with cough), start with the infection control measures and inform the individual responsible for the influenza surveillance.

Completed by: ____________________ Date: ____________________

Chapter 4. Patient Management III

Management of patients in Non-traditional Facilities and Telephone advice

4.1 Non-traditional facilities (NTF)

Definition

A Non-Traditional Site is a site that is:

a) currently not an established health care site, or

b) is an established health care site that usually offers a different type or level of care.

The functions of an Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic. (see annex on Non-Traditional Sites and Workers).

It is expected that the number of individuals requiring care during pandemic influenza will exceed the number of beds available in health care institutions. Admitting to hospitals only the seriously ill requiring specialized medical care (Chapter 2), and making use of alternative centres (such as rehabilitation facilities, community centres, schools, churches and hotels) for less ill patients, will optimize the provision of care.

Non-traditional health care facilities will be used for two main purposes:

a) As an extension of overloaded hospitals and clinics, for the care of influenza patients that are not critically ill or not yet well enough to return home, and

b) As domiciliary care, for individuals unable to care for themselves at home.

Rehabilitation facilities, hotels, and other sites, should be provided with additional basic support equipment (like oxygen therapy supplies). Community halls and schools are equipped with toilets and have some cooking facilities; they may be an alternative to hospitals in case of need.

4.2 Telephone advice

Section to be developed.

Hospital Management: Emergency Room, Short-term observation and Ward management, Intensive Care Unit

Patient management in the hospitals will be similar to interpandemic- influenza care. Changes may be required, however, to operate with limited resources, or if the pandemic strain shows an unusual pattern of disease. Prior planning should consider actions to follow in the event of insufficient resources (beds, personnel, equipment and/or drugs), and alternatives. Cancellation of non-urgent admissions and elective surgery will help to relieve pressure for supplies. Unnecessary admissions of influenza patients should be avoided, and alternative community services should be used appropriately. The pandemic influenza committee and the communications network will activate the influenza contingency plan after the WHO informs them of the onset of the pandemic, and will update the provinces about the evolution of the pandemic[206,223].

5.1 Emergency Room

A separate assessment/admission area should be identified for patients with suspected influenza. These patients should be rapidly diverted there to minimize disease transmission. Admission forms will be completed at this point[171] (Appendix 5.I). Patient-triaging and initial assessment are discussed in Chapter 2.

If the patient is not admitted to hospital and is sent home, or to an alternative care centre, provide the patient a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for follow-up as required: usually 48 hours later for adults and 24 hours for children.

5.2 Short-term observation

A special area of the hospital should be assigned for "short-term" observation of those patients whose clinical assessment does not lead to a definitive admission (see patient-triaging in Chapter 2).

5.3 Ward management

Standard ward management of influenza patients should occur. Local plans to address potential shortages of beds, personnel, equipment and/or drugs should be in place.

5.3.1 Diagnostic and follow-up tests

The following tests and criteria for patient management, based on clinical assessment of each case, should be considered on admission to hospital. Availability of resources and the pandemic guidelines must be considered. Tests may include (as required, see Chapter 2)

- Chest Radiograph
- Blood cells count
- Urea, creatinine, electrolytes
- Nasopharyngeal aspirate, sputum, cerebrospinal fluid for viral studies (antigen/nucleic acid determination, virus culture), and/or bacterial Gram stain and culture
- Blood culture
- Electrocardiogram, urine analysis, blood glucose.

5.3.2 Specific management

5.3.2.1 Anti-viral therapy (see pandemic guidelines)

Antivirals are most efficient when started within 48 hours of onset of symptoms. Since supply is expected to be limited, drugs may be reserved for patients severely ill or those with high risks for influenza-related complications (for priority groups, see section Antivirals in the pandemic guidelines). Clinical guidelines for the use of antivirals are in Appendix 5.III.

5.3.2.2 Antibiotics

Antimicrobial therapy is indicated for treatment of patients with secondary bacterial pneumonia (Appendix 5.IV)[130,140,63]. In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Antibiotics may also be needed to treat bacterial otitis media, which is uncommon in adults but can complicate influenza in children younger than 12 years[36,101]. Clinical guidelines for the use of antibiotics are in Appendix 5.IV.

5.3.3 General management

- Fluid therapy. Ensure adequate fluid intake (fluid management in patients with primary viral pneumonia must be well assessed and closely monitored, because some of these patients may develop adult respiratory distress syndrome (ARDS), and under these circumstances restricted intake of liquids may be indicated[171].
- Oxygen therapy based on pulse oximetry
- Management of associated cardiovascular illness

5.3.4 Symptom control

5.3.5 Discharge Criteria and follow-up

A shortage in hospital beds is anticipated; therefore identification of patients who can be discharged or transferred to an alternative care centre must be timely. Patients will be considered clinically stable when, in the preceding 24 hours[171]:

- Their mental state returned to normal (or baseline)
- They are able to maintain oral intake
- Their vital signs remained within a specified threshold. Cut-off values should be established (e.g., O_2 saturation > 90%, heart rate 100/minute, respiratory rate 24/minute, blood systolic pressure 90 mm Hg, temperature 38°C).

Once the patients are clinically stable for at least 24 hours, symptoms and signs have improved, oral therapy is being given, and they are functionally independent, discharge from the hospital with designated follow up may be considered. The use of an alternative centre of care (domiciliary care) should be contemplated if more prolonged observation is necessary for patients with pneumonia, co-morbidities, or for individuals who are not functionally independent.

Release and follow-up:

If the patient is sent home, provide a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for home care/follow-up as required: usually 48 hours later for adults and 24 hours for children.

e) Arrangements for alternate care may be required by some patients

5.4 Intensive Care Unit (ICU)

Management of patients in the ICU will be similar to interpandemic influenza care. The clinical presentation of the disease and the availability of resources will determine which changes may be desirable throughout the pandemic. Infection control in the ICU, on the other hand, will be essential to avoid transmission of the virus to critically ill, non-influenza, patients. The isolation of influenza patients should be planned in advance .

5.5 Death Registration

(see Infection control guideline for information on mortuary care)

A substantial increase in mortality throughout the pandemic is anticipated. To ensure appropriate handling of bodies, a plan for death registration must be developed beforehand.

Death registration is a provincial/territorial (P/T) responsibility and each P/T has its own laws, regulations, and administrative practices to register a death. Therefore, provincial regulations must be followed.

In the pandemic situation, each jurisdiction should have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be found to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some central authority (e.g., provincial attorney general). These special arrangements must be planned in advance of the pandemic and take the regional differences in resources, geography, and population into consideration.

Appendix 5.I. Admission form[171]

Identification

Health Care Number:	Hospital:
Name: ______________________ Surname/Family Name First Name	
Age _____ (yrs)	DOB ___/___/___ DD MM YYYY
DATE OF THIS ADMISSION ___/___/_____ DD MM YYYY	

Risk Assessment for Complications of Influenza[152,1,171,29]

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**
- Tick all relevant conditional/groupings.

High-Risk Groups (adult/children)	Tick all relevant
Chronic cardiac disease (hypertension is not enough)	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - COAD or emphysema	
Chronic pulmonary disease - other than asthma, COAD or emphysema	
Chronic renal disease	
Non insulin dependent diabetes mellitus	
Insulin requiring diabetes mellitus	
Child with cyanotic congenital heart disease	
Adult/child receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Anemia, Hemoglobinopathy	
Children or adolescent (<18 years) treated for long periods with ASA	
Women in the second or third trimester of pregnancy	
Resident of nursing home	
Resident of other chronic care facility	
65 year old or 2 years old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?						

Details of antivirals: Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Current Medications

Drug	Details

Symptoms

Date and time of onset of first symptoms ______________________

Clinical features on history	YES	NO	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with someone with influenza in the last 3 days?				
Fever				
Chills				
Myalgia				
Arthralgia				
Headache				
Runny/stuffy nose				
Fatigue				
Cough				
Purulent sputum				
Pleuritic chest pain				
Retrosternal soreness (tracheitis)				
Breathlessness				
Anorexia				
Vomiting				
Diarrhea				
Fluid intake				
Rash				
Other symptoms				

Examination Findings

Date ____/____/______ **Time:** ______:______
DD MM YYYY HH MM

Vital signs

Description	Vital signs for this patient	Outside Boundaries	Values for this patient
Temperature		<35 C or 39 C	
Respiratory Rate		24/minute	
Heart rate		100/minute (>16years)	
Blood pressure		Systolic BP <100 mmHg	
Altered mental status			
Oxygen saturation		<90% on room air	
Total score			

Respiratory examination

	Left		Right	
	Yes	No	Yes	No
Reduced chest expansion				
Wheezes				
Crackles				
Bronchial Breathing				
Increased vocal resonance				
Reduced breath sounds				

Investigations

(Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce. Under optimal circumstances, blood work and CXR should be obtained before admission).

Description	Detailed findings	Outside Boundaries	Values for this patient
Chest radiograph		Pleural effusion Consistent with pneumonia Congestive heart failure	
Arterial Blood Gas[a]	pH $p0_2$ $pC0_2$	PH <7.35 < 90% room air > 45 mm Hg	
Pulse oximetry		< 90% room air	
Chemistry	Na K Creatinine Urea	Na 125meq/l or 148meq/l K 125meq/l or 5.5meq/l Creatinine 150mmol/l[b] BUN 10.7mmol/l[b]	
Liver function	Albumin ALT (alanine minotransferase) AST (aspartate aminotransferase)	< 35 g/l > 35 U/L > 35 U/L	
Glucose		Glucose 3mmol/l or 13.9mmol/l	
CBC	Hgb WBC[c] Platelets	Hgb 80g/l; Haematocrit <30% WBC 2,500 or 12,000 Platelets 50,000	

[a] Usually not required, except in COPD.

[b] One of these tests is enough

[c] Laboratories will do cell differentiation only on request.

Other investigations

Investigation	Requested Y/N	Specimen collected Time/date	Result
Sputum Gram stain			
Culture			
Acute serology			
Blood culture X 1			
Rapid viral test NPA			
Viral culture NPA			
Viral culture nasal swab			
CK total			
Electrocardiogram			

Microbiologic diagnostic tests (bacteriologic and/or virologic) will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions (see Appendix 5.II). Isolation and culture of the virus is needed for surveillance purposes.

Ideally, all purulent sputum will be analysed by Gram staining and culture (and in some cases, sensitivity tests), to identify infecting bacteria and their susceptibility. If culture is not possible, at least Gram staining should be attempted.

Ideally, blood cultures should be obtained when the white blood cell number is over 12,000/ml, or less than 3,000/ml, the percentage of bands is higher than 15%, or if pneumonia is suspected. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

Provisional Diagnosis

Please tick all that apply

	Yes	No
Influenza		
Confirmed (by rapid viral test, other)		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Influenza Pneumonitis		
Confirmed (by chest radiograph and oxygen transfer)		
Suspected (by oxygen transfer)		
Unlikely		
Bacterial Pneumonia		
Confirmed		
Suspected		
Unlikely		
Other		
Pregnant		
Breastfeeding		
Other diagnosis		

Disposition

Admitted

- ICU
- General Ward
- Other

Not admitted

Sent to:

- Hospital in the Home
- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

Appendix 5.II. Rapid Virologic Diagnostic tests

After the first isolation of the pandemic strain in Canada, diagnostic tests will be needed to follow the course of the pandemic in the country and for the timely detection of the virus in different communities. Early diagnosis will direct prophylaxis and may allow limiting the pandemic spread until vaccines are available. Similarly, in isolated rural areas and in northern communities as well as in semi-closed groups in urban areas (e.g., jails and long term care facilities), the early detection of the virus will permit the institution of appropriate measures to control the spread of the outbreak and to start prophylaxis and/or treatment of high-risk contacts and of indispensable individuals.

Once the pandemic strain has been isolated in a community, virologic tests will be required only for surveillance purposes (virus isolation), and to test atypical cases if the result of the test will change the management of the patient and/or contacts (rapid tests and, in some cases, virus isolation).

Rapid diagnostic tests detect influenza antigens or viral nucleic acids in nasopharyngeal secretions or swabs, nasal wash, or sputum (see Table). Rapid tests for novel viruses of pandemic potential should be developed during the inter-pandemic period. At the time of a pandemic, rapid methods that will detect the new pandemic strain will have to be identified; information regarding the reliable and affordable methods should be communicated to the front-line diagnostic laboratories. Samples should be collected within the first 4 days of illness. The quality of the sample is critical for the sensitivity of the test, and nasopharyngeal aspirates are the best samples.[226,31].

Using culture as the gold standard, the sensitivity for most rapid tests that can be done in a physician's office is approximately 70% and the specificity is about 90% (i.e., that ~ 30% of samples that will be positive by viral culture may give negative results by rapid tests, and about 10% of positive tests will be false-positives[31]).

Point-of-care tests have a role in the timely diagnosis of outbreaks and in providing guidance for antiviral treatment or prophylaxis. However, rapid tests cannot replace culture but need to be used in combination with viral culture. This is because presently only culture can identify subtypes and aid with surveillance and vaccine planning.

Table 5.1. Diagnostic tests for influenza[a]

Procedure	Influenza types	Specimens	Time for results	Point-of-care
Viral culture	A and B	NP[b] swab, throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	5-10 days[c]	No
Immunofluorescence	A and B	NP[b] swab, nasal wash, bronchial wash, nasal aspirate, sputum	2-4 hours	No
Influenza Enzyme Immuno-Assay (EIA)	A and B	NP[b] swab, throat swab, nasal wash, bronchial wash	2 hours	No
Directigen Flu-A Bencton-Dickinson	A	NP[b] swab, throat swab, nasal wash, nasal aspirate	< 30 minutes	Yes
Directigen Flu-A+B Bencton-Dickinson	A and B	NP[b] swab, throat swab, nasal wash, nasal aspirate	< 30 minutes	Yes
Flu OIA (Biostar)	A and B[d]	NP[b] swab, throat swab, nasal aspirate, sputum	< 30 minutes	Yes
Quick Vue (Quidel)	A and B[d]	NP[b] swab, nasal wash, nasal aspirate	< 30 minutes	Yes
Zstat Flu (Zyme Tx)	A and B[d]	Throat swab	< 30 minutes	Yes
RT-PCR[e]	A and B	NP[b] swab, throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	1-2 days	No
Serology: Hemagglutination Inhibition (HAI)/ Complement fixation (CF)	A and B	Paired acute and convalescent serum samples	> 2 weeks	No

[a] List published by the CDC[31], it may not include all test kits approved in Canada.

[b] NP = nasopharyngeal

[c] Shell vial cultures, if available, may reduce the time for results to 2 days

[d] Does not distinguish between influenza A and B

[e] RT-PCR = reverse transcriptase polymerase chain reaction

Appendix 5.III. Antiviral Drugs for preventing and treating influenza

Two classes of drugs, adamantanes (amantadine and rimantadine) and neuraminidase inhibitors (NI, zanamivir and oseltamivir) are currently available for prevention and treatment of influenza[211,3]. Adamantanes act by inhibiting the activity of the M2 protein, required for the release of viral genetic material inside the cells[126,211]. These drugs reduce viral shedding and decrease the duration of illness by approximately one day if started within 48 hours of illness onset[40,164,213]. However, reduction of complications, or improved outcomes for hospitalized patients has not been adequately evaluated yet. Amantadine is the only adamantane approved in Canada for prophylaxis and treatment of influenza; it is active only against influenza A[126,34].

Intolerance, and the rapid development of resistance to amantadine and rimantadine are major limitations to the use of these agents. Resistance is the consequence of a single point mutation in the M2 gene that completely abolishes the binding of the drug without affecting the transmission to susceptible contacts[98]. Adamantanes have a relatively long half-life, and, since amantadine depends on renal function for excretion, dose adjustments and close supervision are required in cases of renal insufficiency. In addition, central nervous system side effects are relatively frequent after amantadine (10-30%)[40,211]. Teratogenicity as well as embryo-toxic effects have been reported in animals, and studies of pregnant women receiving amantadine to treat Parkinson's disease, show variable adverse effects in the offspring, including miscarriage[83,91].

Neuraminidase inhibitors (NI), on the other hand, inhibit the neuraminidase molecule (NA), indispensable for the release of new-formed virus from infected cells. Neuraminidase inhibitors are active against human influenza A (all 9 known NA molecules) and B viruses, and also against avian viruses[210,212,211]. Two drugs of this group are presently approved in Canada for the treatment of influenza infections: zanamivir, which is delivered by an aerosol and oseltamivir, an oral drug. Zanamivir has a short plasma half-life, but it can be found in the tracheobronchial tree for over 24 hours after inhalation of a single dose. It should be used with caution in patients with underlying airway disease (asthma or COPD) because of the possibility of bronchospasm, an infrequent but potentially serious side effect[211,40]. Oseltamivir, on the other hand, requires dose reduction for patients with low creatinine clearance (<30 mL/min)[1]. Gastrointestinal intolerance (usually lasting less than a day) occurs in 5-15% of oseltamivir recipients but seldom (< 2%) leads to drug discontinuation. Oseltamivir causes no other important side effects[213].

Neuraminidase inhibitors decrease the duration of illness approximately by one day, when used within 48 hours of the onset of illness[211]. Although there are no studies to date demonstrating improved outcomes after hospitalizations or reduced mortality after treatment of patients with influenza with NI, a drop in antibiotic use for lower respiratory complications, and fewer secondary complications such as clinically diagnosed bronchitis and sinusitis have been reported[213]. Neuraminidase inhibitors have been approved for clinical use only recently (1999[1]), therefore, more studies are required to confirm their safety and activity in preventing and treating influenza in high-risk individuals.

Prophylaxis and Treatment with Antiviral Drugs

Indications, Doses, Toxicity

The current indications (year 2002) for the use of antivirals in the prophylaxis and treatment of influenza in Canada are[3]:

1. **Amantadine (Symmetrel^R):**

   Prophylaxis: Prevention of respiratory infections caused by influenza A virus strains.

   Treatment: Treatment of respiratory infections caused by influenza A strains.

2. **Zanamivir (Relenza^R):**

   Treatment of **uncomplicated acute illness due to influenza virus in patients 12 years and older who have been symptomatic for no more than 2 days**.

3. **Oseltamivir (Tamiflu^R):**

   Prophylaxis: Since December 2003, oseltamivir is licensed in Canada for prophylaxis in adults and adolescents 13 years of age and older. The safety and efficacy of oseltamivir for prophylaxis in pediatric patients younger than 13 years of age have not been established. Please refer to the Health Canada website http://www.hc-sc.gc.ca/ for future recommendations by the National Advisory Committee on Immunization.

   Treatment: of uncomplicated acute illness due to influenza infection in adults who have been symptomatic for no more than 2 days.

Amantadine is protective when used for prophylaxis up to a 6-week period. When used for treatment, the drug does not interfere with the development of protective antibodies. Drug resistance has been induced with amantadine, when used for prophylaxis and concurrent treatment in outbreaks. Special issues need to be considered when amantadine is used for prophylaxis, especially for a long period (6 weeks was the longest period formally studied in controlled trials). These issues include[1] the need for individualized prescriptions for amantadine use due to its low toxic: therapeutic ratio and its dependency on renal function for elimination[2], the need to monitor subjects for side effects and[3] the need to consider the relatively high risk of emergence of drug-resistant virus and to adjust the management of patients when prophylaxis fails and treatment has to be started[3].

Neuraminidase inhibitors showed efficacy for post-exposure prophylaxis and for treatment of influenza infections. To date, resistance to zanamivir and oseltamivir has been shown to occur infrequently in normal hosts[210,211]. In one immunocompromised child treated with zanamivir for influenza, zanamivir resistant virus was detected[210,89], but to this time, intensive surveillance for resistant mutants has demonstrated that NI-resistance emerges uncommonly during therapy. Intense surveillance for NI-resistance emergence is ongoing (F. Aoki, personal communication). On the other hand, viruses resistant to zanamivir have been isolated in vitro, after passages in cell cultures, and the mutations that abolish the binding of the drug have been characterized[210,90]. Since the functional groups of the two neuraminidase-inhibitors have some differences in their binding sites, mutants resistant to one drug may be susceptible to the other[210,90].

Table 5.2. Recommended doses*[1,152]

Drug (trade name)	Prophylaxis (P)*, Doses	Treatment (T)*[c], Doses	Level of evidence and Grade of Recommendation**
Amantadine (Symmetrel^{R})	Children: 1-9 years, according to their weight[a]	Children: 1-9 years, according to their weight[a]	Children: Prophylaxis: I/A Treatment: I/A
	Adults: 100 mg/2 times per day[a]	Adults: 100 mg/twice daily, 5 days[a] 65 years: 100mg/day[a]	Adults: Prophylaxis: I/A Treatment: I/A
Zanamivir[b] (Relenza^{R})	Not yet approved	Children: 7 years, 10 mg/ 2 times per day, 5 days[b]	Children: Prophylaxis: no data Treatment: I/A
		Adults: 10 mg (2 puffs)/2 times per day, 5days[b]	Adults: Prophylaxis: I/A Treatment: I/A
Oseltamivir (Tamiflu^{R})	Adults and adolescents older than 13 years of age[d]	Children: (1 year according to their weight[e]	Children: Prophylaxis: no data Treatment: I/A
		Adults: 75 mg/2 times per day, 5 days	Adults/adolescents: Prophylaxis: I/A Treatment: I/A

*As currently recommended in Canada. Please refer to the current product monographs for dosage recommendations.

** Level of evidence (I-V) and Grade of Recommendation (A-C)[3]. Grade A recommendation for therapy (i.e., good support) requires the support of level I evidence (i.e., evidence from at least one properly randomized controlled trial, or from trials with large samples, or from meta-analysis of multiple smaller studies with consistent results).

[a] For children 1-9 years of age the recommended doses of amantadine are: 5.0 mg/kg per day, up to a maximum of 150mg/day, in two divided doses. For children (10 years old, who weigh > 40 kg, the recommended doses are 200 mg/day in two doses[1,3,152]. Treatment will continue until defervescence, up to a maximum of 3-5 days. For prophylaxis up to 6 weeks. Doses have to be reduced and monitored in individuals with seizures (100 mg/day) and in individuals with renal dysfunction. The amantadine hydrochloride dosages recommended by NACI for patients of different ages, and according to renal status are in Table 5.3[152]:

[b] Zanamivir is inhaled orally; therefore, children younger than 5 years and elderly adults may require assistance in the use of the Diskhaler™ provided by the manufacturer.

[c] Treatment should be initiated as soon as possible and no more than 48 hours after onset of symptoms (better after 36 hours or less), because the earlier is the start the more effective are the results[213,164].

[d] Please refer to the current product monograph for dosage recommendations.

[e] Recommended dose of oseltamivir oral suspension for pediatric patients 1 year.

Table 5.3 Amantadine dosage

<table>
<tr><td colspan="3">No renal impairment</td></tr>
<tr><td>Age</td><td colspan="2">Dosage</td></tr>
<tr><td>1-9 years</td><td colspan="2">5 mg/kg once daily, or divided twice daily, total daily dose not to exceed 150 mg</td></tr>
<tr><td>10-64 years</td><td colspan="2">200 mg once daily, or divided twice daily</td></tr>
<tr><td>65 years</td><td colspan="2">100 mg once daily</td></tr>
<tr><td colspan="3">Renal impairment</td></tr>
<tr><td>Creatinine clearance ml/min/1.73 m²</td><td>Dosage for those 10-64 years of age</td><td>Dosage for those ≥ 65 years of age</td></tr>
<tr><td>80 ml/min</td><td>100 mg twice daily</td><td>100 mg once daily</td></tr>
<tr><td>60-79 ml/min</td><td>Alternating daily doses of 200 mg and 100 mg</td><td>Alternating daily doses of 100 mg and 50 mg</td></tr>
<tr><td>40-59 ml/min</td><td>100 mg once daily</td><td>100 mg every two days</td></tr>
<tr><td>30-39 ml/min</td><td>200 mg twice weekly</td><td>100 mg twice weekly</td></tr>
<tr><td>20-29 ml/min</td><td>100 mg three times/week</td><td>50 mg three times/week</td></tr>
<tr><td>10-19 ml/min</td><td>Alternating weekly doses of 200 mg and 100 mg</td><td>Alternating weekly doses of 100 mg and 50 mg</td></tr>
</table>

Table 5.4. Doses of oseltamivir in children

Body Weight in kg	Recommended dose for 5 days
15 kg	30 mg twice daily
> 15 to 23 kg	45 mg twice daily
> 23 to 40 kg	60 mg twice daily
> 40 kg	75 mg twice daily

Doses should be reduced by one-half in patients with creatinine clearance <30 mL/min[1], although oseltamivir does not cause dose-related side effects (specifically more nausea and vomiting at higher doses).

Table 5.5. Side effects and adverse reactions

Side effects	Amantadine*	Zanamivir**	Oseltamivir
Gastrointestinal	Vomiting Nausea Anorexia		Nausea Vomiting (less severe if taken with food)
CNS	Nervousness Anxiety Insomnia Seizures Delirium Hallucinations		
Cardiovascular	Arrhythmias, in over dosage		
Respiratory		Bronchospasm Exacerbation of underlying chronic respiratory disease	

* Side effects are usually mild and diminish or disappear after one week taking the drug. Serious effects have been observed, however, associated with high plasma concentrations of the drug Toxicity is observed more frequently in individuals with renal insufficiency, seizures, in the elderly, or after higher doses.

** Zanamivir is not recommended in individuals with asthma or chronic obstructive pulmonary disease; however, if the benefits surpass the risks, the drug should be used with caution and under proper monitoring and supportive care.

Drug interactions

Limited clinical data are available regarding drug interactions and careful observation is recommended when administered concurrently with drugs that affect the nervous system, antihistamines, or drugs that may interfere with the excretion by the kidneys (i.e., probenecid). **Package inserts should be consulted**.

New developments

New drugs are being developed for the prevention and treatment of influenza infections, and such developments may change the existing guidelines. Particularly, a single dose dimerized zanamivir[177] is presently in early trials, and may be a good candidate in case of a pandemic.

Pandemic use of antivirals

Limited data are available about the potential of antivirals to prevent infection and/or treat disease in pandemic situations. Amantadine was observed to be efficacious and safe for prevention and treatment of infection due to influenza A/Hong Kong/68 in the year after its appearance in 1968.

During a pandemic, the antiviral strategy should utilize all anti-influenza drugs available to Canadians. Either M2 ion channel inhibitors (e.g., amantadeine) or neurominidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.

Rationale for the roles of amantadine and neuraminidase inhibitors (Annex E):

1. Rapid emergence of resistance has been observed during amantadine treatment but resistance has been uncommonly observed during therapy with neuraminidase inhibitors.
2. Neuraminidase inhibitors are currently approved for treatment. Oseltamivir is now licensed for prophylaxis in adults and adolescents over 13 years of age .
3. Although neuraminidase inhibitors are associated with fewer side effects and viral resistance may be less likely to develop as compared to amantadine, evidence that they have a greater efficacy than amantadine for prophylaxis is still required. The cost of these drugs is substantially greater than that of amantadine.

Chemoprophylaxis is not a substitute for vaccination; however, it is expected that vaccines are not going to be available (or will be available only in limited amounts), during the first months of a pandemic. In addition, not all patients can be vaccinated and some individuals may need supplementary protection until their antibodies reach a protective level or because their immune system is defective. Since the pandemic strain will be new for the population, a second dose of the vaccine may be required before protective immunity is developed; therefore, protective prophylaxis may be needed for up to 6 weeks: 4 weeks after the first dose and 2 after the second dose[1].

It is expected that there will be a limited supply of anti-influenza drugs available during a pandemic; therefore, priorities for the use of these agents have been established. Epidemiological surveillance during the pandemic will confirm these priorities or identify new priority groups.

(Preliminary) priority groups (Annex E)

The following groups in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.

1. Treatment of persons hospitalized for influenza
2. Treatment of ill health care and emergency services workers
3. Treatment of ill high-risk persons* in the community
4. Prophylaxis of health care workers
5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
6. Prophylaxis of essential service workers
7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
8. Prophylaxis of high-risk persons* in the community

***Note**: during a pandemic the definition of high risk persons may change based on epidemiologic evidence.

The mass prophylaxis of children to control a pandemic is currently not recommended.

Appendix 5.IV. Antibiotics

Antimicrobial therapy will be indicated for treatment of patients with secondary bacterial pneumonia[130,140,63]. Acute bacterial sinusitis is another secondary bacterial infection, but antimicrobials are not indicated for this complication unless symptoms are severe. Otitis media, another potential bacterial superinfection, is uncommon in adults but very common in children. Diagnosis of secondary bacterial pneumonia should be considered with:

1. Clinical deterioration after a period of clinical improvement following the initial onset of influenza; especially if there is a new onset of purulent sputum or dyspnea.
2. Radiographic consolidation.

Purulent sputum without radiographic consolidation is not an indication for antimicrobial therapy, unless the patient has pre-existing chronic obstructive pulmonary disease. Expectoration of purulent sputum with a normal chest radiograph, concomitant or shortly after the onset of influenza (up to 14 days), however, suggests bacterial bronchitis. If it is severe, or occurs in individuals vulnerable to superinfection, the use of antibiotics should be considered[171].

In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Acute bacterial sinusitis does not require antibiotic treatment if symptoms are mild or moderate. Most patients with a clinical diagnosis of rhinosinusitis improve without antibiotic treatment and, therefore, only appropriate doses of analgesics, antipyretics and decongestants should be offered. Only patients with severe or persistent symptoms and clinical findings specific for bacterial sinusitis should be treated with antimicrobials. Narrow spectrum antibiotics are reasonable first line agents for these patients.

Issues to be considered in providing antimicrobial therapy in the pandemic influenza setting include:

- The availability of antimicrobials during a pandemic may be limited because of increased demand. Provincial and federal governments should have antibiotics stockpiled for such a contingency. However, the potential limited supply means antimicrobials should be prescribed judiciously. Influenza infection, by itself, without secondary bacterial complications, should not be treated with antimicrobials.
- A wide variety of antimicrobial agents will be effective for the treatment of secondary bacterial pneumonia. As a general rule, it is not desirable to treat all individuals with the same antibiotic, as this may promote resistance to that antimicrobial and limit efficacy. A variety of antimicrobials that are effective are listed in Table 1. **Antimicrobials for empiric treatment should be reviewed and updated regularly, considering the availability of new antimicrobials and the evolution of bacterial resistance among respiratory pathogens.**
- *Staphylococcus aureus* is a pathogen isolated frequently in secondary bacterial pneumonia and initial antimicrobial therapy should include coverage for methicillin

susceptible *Staphylococcus aureus*. Other common bacteria include *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and group A streptococcus. Antimicrobials which provide a broader coverage for resistant organisms should be considered in selected circumstances: patients known to previously have had infection with a resistant organism; patients who have failed or recurred following initial antimicrobial therapy; and patients who have severe clinical presentations including respiratory failure or hemodynamic instability.

- Antimicrobial resistance is a consideration in antimicrobial selection. Current levels of resistance are low but increasing, and the clinical impact of antimicrobial resistance in respiratory infections remains controversial. The prevalence of antimicrobial resistance in common respiratory pathogens should be monitored in the pre-pandemic period and during the pandemic in patients with bacterial pneumonia. This information must be provided to practicing physicians in a timely manner.
- For adult patients hospitalized with a diagnosis of bacterial pneumonia, a sputum specimen for culture and susceptibility testing should be obtained, whenever possible. Once culture results are available, usually in 48-72 hours, antimicrobial therapy should be reassessed and modified based on these results. Sputum specimens from ambulatory patients would not be routinely recommended, but should be obtained if patients have recently received antimicrobial therapy, or if the clinical response to initial antimicrobial therapy is sub optimal.
    - Patients not admitted to hospital may be treated with oral therapy. Patients admitted to hospital will usually require parenteral therapy, but oral therapy may be considered for selected cases. Parenteral therapy should be modified to oral therapy once the patient has stabilized. The selection of an antimicrobial agent will be based on sputum and blood culture and sensitivity results, patient tolerance, local prevalence of antimicrobial resistance, and availability.

Table 5.6. Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia (adults ≥ 18 years)

Please refer to the current product monograph for the most up to date recommendations on antibiotic dosage, precautions and side effects.

Oral: First line
› Second generation cephalosporin (e.g., cefuroxime, cefaclor) › clarithromycin* › azithromycin* › erythromycin* › doxycycline › trimethoprim/sulfamethoxazole (TMP/SMX)
Increased likelihood of high level resistance
› Amoxicillin/clavulanic acid › levofloxacin › moxifloxacin › gatifloxacin
Parenteral
› Second generation cephalosporin (e.g., cefuroxime) › Third generation cephalosporin if septic (e.g., ceftriaxone, cefotaxime) › piperacillin/tazobactam › levofloxacin › gatifloxacin › imipenem (if septic) › meropenem (if septic)

* Macrolides should only be used as a first line agent when bacteremia is unlikely.

Table 5.7. Antimicrobials for the treatment of secondary bacterial pneumonia in patients with influenza where the infecting organism and susceptibility are known from sputum or blood culture (adults ≥ 18 years)

Please refer to the current product monograph for the most up to date recommendations on antibiotic dosage, precautions and side effects.

Organism	Antimicrobial
Streptococcus pneumonia	
› penicillin susceptible	penicillin G, amoxicillin, erythromycin*, clarithromycin*, azithromycin*, doxycycline
› penicillin high level resistance	amoxicillin (high dose), levofloxacin, gatifloxacin, moxifloxacin, third generation cephalosporin (e.g., ceftriaxone, cefotaxime)
Haemophilus influenzae	
› beta lactamase negative	amoxicillin, ampicillin (IV), cefuroxime , clarithromycin, azithromycin
› beta lactamase positive	TMP/SMX, second generation cephalosporin (e.g., cefuroxime) , third generation cephalosporin (e.g., cefotaxime, ceftriaxone), clarithromycin*, azithromycin*, amoxicillin/clavulanic acid, ciprofloxacin, levofloxacin, gatifloxacin, moxifloxacin
Staphylococcus aureus	
› methicillin susceptible	cloxacillin, TMP/SMX, first generation cephalosporin (e.g., cephalexin, cefazolin), clarithromycin*, azithromycin*
› methicillin resistant	vancomycin, linezolid (use clindamycin or TMP/SMX if sensitive)

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availablility of specific antibiotics.

* Macrolides should only be used if bacteremia is absent.

Management of Bacterial Pneumonia in children

Once bacterial pneumonia is diagnosed (or strongly suspected), therapy with antibiotics should be initiated without delay. When possible, the Gram stain of sputum or tracheal aspirate should be obtained. If not, an empiric treatment should be started (based on the frequency of pathogens for the different age groups and on the most common agents identified in the community)[121,157,143]. Children with mild disease can be treated at home; however, hospitalization (or alternative centre of care) will be indicated for very young children (first year of life), those children with severe disease, those who look toxic and/or have severe pulmonary dysfunction, and also for those children who may not receive appropriate care at home.

Table 5.8. Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia in children[143]

Age	Outpatient (oral)	Inpatient	Inpatient with signs of sepsis, and/or alveolar infiltrate or pleural effusion
3w- 3m	Afebrile: Erythromycin or Azithromycin Admit if fever or hypoxia	Afebrile: Erythromycin* IV Febrile: Add Cefotaxime	Cefotaxime IV
4m- 4y	Amoxicillin	Ampicillin IV	Cefotaxime IV, or Cefuroxime IV, or Ampicillin IV
5-15y	Erythromycin, or Clarithromycin, or Azithromycin, or Doxycycline (>8 years)	Erythromycin* IV, or Azithromycin* IV, or Doxycycline IV (>8 years)	Cefotaxime IV, or Cefuroxime IV consider adding Azithromycin IV

* Macrolides should only be used as a first line agent when bacteremia is unlikely.

Table 5.9. Antimicrobials for the treatment of secondary bacterial pneumonia in children with influenza, where the infecting organism and susceptibility are known from sputum or blood culture (≤ 18 years)[121]

Organism	Antimicrobial
Streptococcus pneumonia	
› penicillin susceptible	Penicillin G (IV, IM), Penicillin V (oral), azithromycin*, clarithromycin* TMP/SMX
› penicillin high level resistance	third generation cephalosporin (e.g.cefotaxime or ceftriaxone), Vancomycin
Haemophilus influenzae	
› beta lactamase negative	Amoxicillin, ampicillin, azithromycin*, clarithromycin*
› beta lactamase positive	second generation cephalosporin (e.g., cefuroxime,) third generation cephalosporin (e.g., cefotaxime, ceftriaxone), amoxicillin/clavulanic acid, azithromycin*, clarithromycin* and TMP/SMX
Staphylococcus aureus	
› methicillin susceptible	Cloxacillin, first generation cephalosporin (e.g.cephazolin), cephalexin
› methicillin resistant	Vancomycin, linezolid (use clindamycin* or TMP/ SMX if sensitive)

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availablility of specific antibiotics.

* **Macrolides should only be used if bacteremia is absent.**

The drug of choice for pneumonia due to *S. pneumoniae* is penicillin G. Cefotaxime or ceftriaxone should be used if the isolate is resistant to penicillin, and vancomycin if it is resistant to both[1]

Chapter 6. Special circumstances

6.1 Remote Rural areas and Aboriginal Communities

The last Census of Population, in 2001, revealed that 79.4% of Canadians live in urban areas with a population of 10,000 people or more[202]. This also means that about 6.2 millions of Canadians live in communities with a population of less than 10,000 individuals, including several communities of less than 1,000 individuals. Although some of these groups live in semi-urban settings adjacent to metropolitan areas in the south of Canada, about 6% of the total Canadian population (i.e., about 1.8 million persons, 30% of them aboriginal people) live in remote areas in the north, "shaped by distances, weather, limited resources, and little backup from urban centres"[139].

Registered Nurses are the predominant primary healthcare providers for remote and isolated communities in the north, and for southern rural areas. They work in community health clinics, outpost nursing stations, small rural hospitals and other facilities. In small towns of less than 5,000 inhabitants, the hospital (if there is one) is usually the only health-care facility available, and nurses (less than three in any shift) manage patients in collaboration with on-call physicians (frequently living 100 km or more away). Patients who cannot be managed in their communities are transported by air or road to secondary or tertiary centres, sometimes located at considerable distances (200 or more kilometres)[139,111].

In some northern First Nations' and Inuit communities, low density of human population has led to regional, instead of community-centred services. While resident nurses and paraprofessionals provide primary health care for larger populations, smaller communities have only a community health representative who works alone, with the support of a nurse visiting once a week and of long distance telephone consultations. In the event of a crisis, patients have to be taken out to larger urban centres. In some areas four out of five communities are accessible only by airplane[20,111].

Co-morbidities

Past epidemics of respiratory illness in remote communities in the north were characterized by high morbidity and mortality. Particularly influenza A has been associated with high attack rates (86-100%) and high case fatality (5-10%, sometimes higher). Improvements in health care decreased the burden of disease, but it remains higher than in the rest of the country[217]. The reasons for that include co-morbidity factors like high prevalence of underlying lung disease, environmental factors like smoking and living under crowded conditions in houses with poor ventilation, and low antibody levels to common pathogens[217,6].

Inuit infants suffer from a high rate of low respiratory tract infections (LRTI) and often require mechanical ventilation. Their rate of admission to hospital for LRTI is one of the highest of the world, and infant mortality in the north is at least twice the Canadian average[6].

First Nations' communities in the north have a high prevalence of coronary disease and type-2 diabetes and the incidence of myocardial infarction is increasing[111].

After the pandemic is declared in Canada, most influenza patients living in remote areas will have to be managed within their communities, without transferring them to larger cities. This requires that each community elaborate guidelines in advance, to direct the appropriate management of patients, medical personnel, and volunteers. The inter-pandemic epidemics suffered almost every year in Canada are an opportunity to develop such strategies and test their efficacy.

Each community will need:

a) A policy for the management of an outbreak, with timely diagnosis and appropriate management of influenza infection in patients.

b) Guidelines for the immunization of citizens, medical personnel, and volunteers once a vaccine is available (in agreement with the national influenza pandemic plan).

c) Guidelines for the use of antivirals if they are available (in agreement with the national influenza pandemic plan). During the early stages of the pandemic, each community should ascertain access to antivirals and antibiotics.

d) Plans to establish an area for triaging patients with respiratory illnesses, with resources and personnel to carry out primary and secondary assessment.

e) To assign a place for the management of more acutely ill patients, where acute care (parenteral therapy and oxygen therapy) and closer monitoring and more intensive nursing care, may be performed.

Emergency preparedness plans for isolated communities are critical, and the influenza pandemic guidelines should be part of these strategies.

6.1.1 Management of an influenza outbreak in isolated communities

The timely detection of an outbreak in a community is essential to implement control measures and to stop the diffusion of the disease. In a pandemic situation, the first case of confirmed influenza would likely lead to outbreak management for pandemic influenza (see Appendix 6.I).

Every community should have in place surveillance for the early detection and control of an outbreak. This includes:

1. Preparation of a written plan for the management of an influenza outbreak, avoiding unnecessary delays. It will include the identification of diagnostic tests, responsibilities of medical and non-medical personnel, and use of antiviral medication.
2. Identification of a person responsible for the surveillance and for the transmission of information in the community. This will usually be the individual with responsibility for infection control; he/she will be also in charge to report to the pertinent authorities when an outbreak has been detected in the area. In an isolated community, the person responsible for surveillance and transmission of information in an outbreak is the Nurse in Charge, the most senior health professional working at the community health centre.

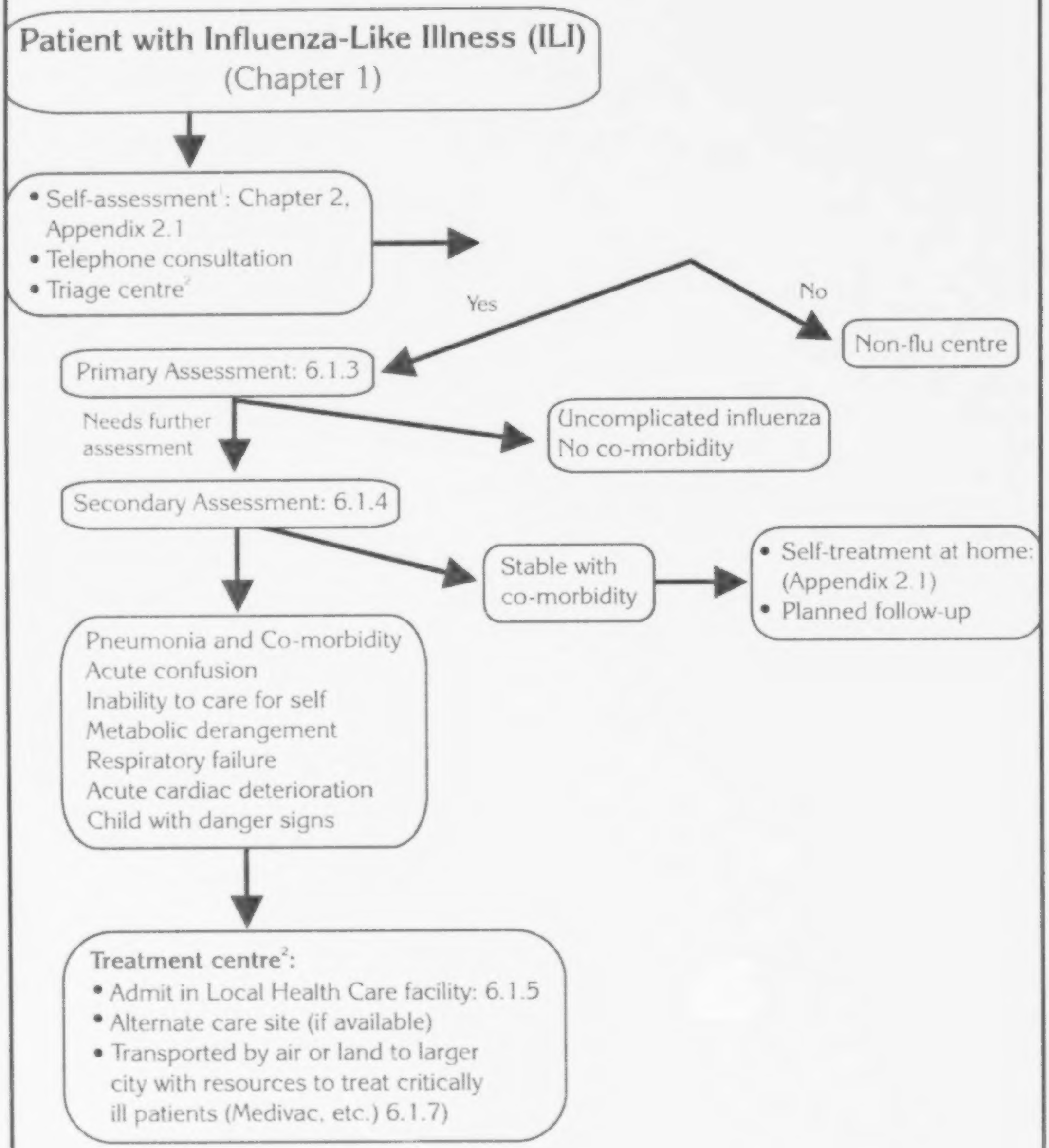
3. Education of all medical and non-medical volunteers of the importance of early identification and notification if a case is suspected.
4. A response capacity maintained 7 days per week.
5. Specific reporting mechanisms and standardized data collection (see appendices in Chapters 2 and 4).

Once the outbreak has been confirmed in the area, the authorities responsible should take all the measures required to control the propagation of the virus within the locality and to neighbour towns (see Infection control document). Studies and treatment of patients will be done in the area assigned for this purpose, and prophylactic treatment of high-risk contacts may be initiated (following the existing framework for antiviral prioritization during the pandemic).

People in rural areas and remote communities usually face unique geographic and resource challenges in the delivery of health care. For these reasons, a pandemic plan that is suitable for urban centres may not be adaptable to rural or remote jurisdictions. The interpandemic period is the best time to plan for health care delivery in an emergency. Each Province and Territory should identify needs, capacity to respond to a pandemic threat, and alternative options in both, large urban centres and in small or remote communities.

The Health Protection Unit, Health and Social Services, in the North West Territories developed a protocol for the management of outbreaks, which is included in their Communicable Disease Manual (February 2000). Appendix 6.I. has a summary of this protocol, adapted to be used in an influenza pandemic.

6.1.2 Triage of patients in small communities[1]


Patient with Influenza-Like Illness (ILI)
(Chapter 1)
• Self-assessment[1]: Chapter 2, Appendix 2.1
• Telephone consultation
• Triage centre[2]
Yes
No
Non-flu centre
Primary Assessment: 6.1.3
Needs further assessment
Uncomplicated influenza
No co-morbidity
Secondary Assessment: 6.1.4
Stable with co-morbidity
• Self-treatment at home: (Appendix 2.1)
• Planned follow-up
Pneumonia and Co-morbidity
Acute confusion
Inability to care for self
Metabolic derangement
Respiratory failure
Acute cardiac deterioration
Child with danger signs
Treatment centre[2]:
• Admit in Local Health Care facility: 6.1.5
• Alternate care site (if available)
• Transported by air or land to larger city with resources to treat critically ill patients (Medivac, etc.) 6.1.7)

Legend for Table 6.1.2

1) This algorithm would apply to isolated cities or towns with a population of less than 10.000 habitants, where only emergency and sub-acute care services are available. Most rural towns as well as some First Nation and Inuit communities may be included in this group. Individuals living in these communities are usually sent to larger cities/towns when they need acute or chronic hospital services.

   It is advisable that influenza patients, or their relatives, learn to evaluate the seriousness of the disease, and to determine if they can care for themselves at home or need further assessment. Appendix 2.I. contains some helpful self-evaluation criteria and instructions for self-treatment. Basic instruction can be given to the general public by TV (an explanatory video), radio, newspapers, pamphlets, and the Internet. Telephone consultation (or consultation through Internet) with competent personnel or volunteers trained for this purpose, may be provided.

   Triage centres may be located at community health clinics, outpost nursing stations, small rural hospitals and other places like pharmacies, schools, churches, community centres, military field hospitals, etc. A special "emergency" area for the triage, secondary assessment and treatment of influenza patients, should be assigned. This should be different from the area regularly used for the triage and treatment of other emergencies. The Health-Care-Centre may be the only recognized centre of treatment in some areas; to alleviate the burden at these centres, alternative places of triage and care and **appropriate staffing and resources should be planned in advance**. At the triage centre, all patients will be evaluated following the primary assessment algorithms described in section 6.1.2 (see also Chapter 2). Some patients more seriously ill may need further evaluation (secondary assessment, section 6.1.3). Treatment and advice may be given. Some health care sites will be able to handle patients more critically ill as well as providing sub-acute care.

2) For some small communities (some have less than 1000 individuals) it may not be possible to operate an alternate centre of care. In these situations, the triage site may be a designated area close to, or in the health care centre. Additional staff must be trained and dedicated to these designated areas in advance of the pandemic, because one or two nurses constitute all the health-care personnel available in these communities. In some small communities, the only health centre available is designed to house patients for up to four hours, until evacuation to hospital is possible. Those patients requiring attention, who cannot be cared for by family, friends or home support workers, may have to be evacuated to a larger centre in other community.

6.1.3 Initial assessment

The initial assessment and evaluation of respiratory patients should be consistent with advance directives, and may include the following (see Chapter 2):

a) History: age, co-morbid illnesses, respiratory and extra-respiratory symptoms, time of onset.

b) Physical assessment: temperature, skin colour, pulse, blood pressure, respiratory rate, chest auscultation, chest pain on inspiration, peripheral oedema, mental status, function (ability to function independently, continuous vomiting, etc.).

c) For patients who are clinically stable and not judged to be severely ill this may be sufficient.

6.1.4 Secondary assessment

When there are concerns about metabolic status, or the degree of illness of an individual, additional tests may be considered. These may include (see Chapter 2):

- CBC with white cell count,
- Electrolytes,
- Blood glucose,
- CPK,
- BUN and creatinine,
- EKG if there is a history of cardiovascular disease and/or evidence of significant deterioration in cardiac status.

Diagnostic testing should include 0_2 saturation, and a chest x-ray should be considered for patients with an oxygen saturation of $\leq 90\%$ on room air, with new purulent sputum, or respiratory rate ≥ 30 per minute.

A sputum culture may be helpful for patients producing purulent sputum (depending on the availability of resources, see Chapter 2).

Laboratory and radiology testing will be very limited. For most health centres in small communities, routine testing is WBC and blood glucose. Chest X-rays and O2 saturation may be done to those who are suspected to have pneumonia, to confirm diagnosis and to decide if they have to be transferred to a larger centre for treatment. Trained support staff will be needed to help the nurses with the testing and for the care of patients remaining in the community. Other testing will have to be referred.

Portable chest x-rays may be needed in some nursing stations.

6.1.5 Management of influenza patients in local health care establishments

A written plan for the timely management of influenza patients who are more seriously ill, but will be treated in the community, should be prepared in advance. It will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and the use of medications. **Resources and support (by medical personnel and volunteers) should be planned in advance.**

a) **Diagnostic and follow-up tests** (in selected patients, see Chapter 2):

- Chest X-Rays
- Blood tests, urine analysis, etc.
- Viral/Bacterial studies: sputum, nasopharyngeal aspirate.

b) **General management**: The goals of general management are to maintain comfort, to preserve functional status, and to limit complications. Specific aspects of management for influenza and its complications include:

1. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
2. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids. Where parenteral fluids are necessary hypodermoclysis is an option rather than intravenous therapy and may be more practical.
3. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications, including secondary pneumonia and/or aggravation of pre-existing disease. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only management approaches.

1. **Antiviral agents** including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and/or treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used, dosage adjustment for renal function is necessary. (See Appendix 5.III)
2. **Antibiotics** should be given for the management of presumed or diagnosed secondary bacterial pneumonia (see Chapter 2 and Appendix 5.IV). It has been reported that First Nations' and Inuit children have more severe low respiratory infections than other children hospitalized for pneumonia; the frequency and severity of upper respiratory infections and otitis media is much higher than in other children[209,6].
3. **Management of preexisting disease**: Cardiovascular, respiratory, metabolic, etc.

6.1.6 Discharge Criteria

Once the patients are clinically stable for at least 24 hours, symptoms and signs have improved, oral therapy is being given, and they are functionally independent, discharge from the local hospital (or designated health care establishment), with follow up, may be considered. The use of an alternative centre of care (domiciliary care) should be contemplated if more prolonged observation is necessary for patients with pneumonia, co-morbidities, or for individuals who are not functionally independent. Domiciliary care may also be used to alleviate local hospitals and care centres; less ill patients that for personal or social reasons are not able to self-care at home will be directed to these places. **Training and support should be planned in advance.**

If the patient is discharged, provide a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for home care/follow-up as required: usually 48 hours later for adults and 24 hours for children.

e) Arrangements for alternate care if this is required.

6.1.7 Transfer to and from Acute Care facilities

Severely ill patients may need to be evacuated to larger cities with appropriate services to provided complex or critical care. **Territorial plans need to be established during the interpandemic period to determine evacuation criteria and to designate which hospitals will receive patients from each community.**

6.2 Correctional and penal institutions

6.2.1 Federal Correctional Institutions

Federal correctional institutions accommodate inmates who are serving 2 years plus one day or more and provincial institutions house individuals sentenced 2 years minus one day or less. Federal institutions can be classified as: maximum, medium, or minimum-security institutions, and establishments with multiple levels of security. Maximum-security institutions can generally accommodate up to 400 inmates while medium security institutions can house up to 525 offenders and minimum-security institutions accommodate from 80 and up to 200 individuals. The rated capacity for women's institutions is much lower.

Health resources

Health services in federal correctional institutions are provided by health care professionals who are registered or licensed in Canada. Access by inmates to health services is available on a 24-hour basis. It can be provided through on-site coverage (nursing care coverage fluctuate from eight to twenty-four hours, depending on the institution security level and location), on an on-call basis, or through other CSC institutions or community services. Contracted medical care is provided in every federal correctional facility, either on-site or off-site.

Most inmates residing in high and medium security institutions live in individual cells, where they may be treated in case of influenza infection. The majority of minimum-security institutions, on the other hand, offer either residential style unit accommodation or regular cell units. Most institutions also have a special area, with some "medical beds", for patients who need special attention and may be treated in the same establishment. However, these beds are not used regularly, because of the lack of nursing supervision after regular operational hours. In case of a pandemic, and provided that they receive night care, such beds may be useful to treat more seriously ill influenza patients within the same institutions[39].

6.2.2 Provincial Correctional Institutions

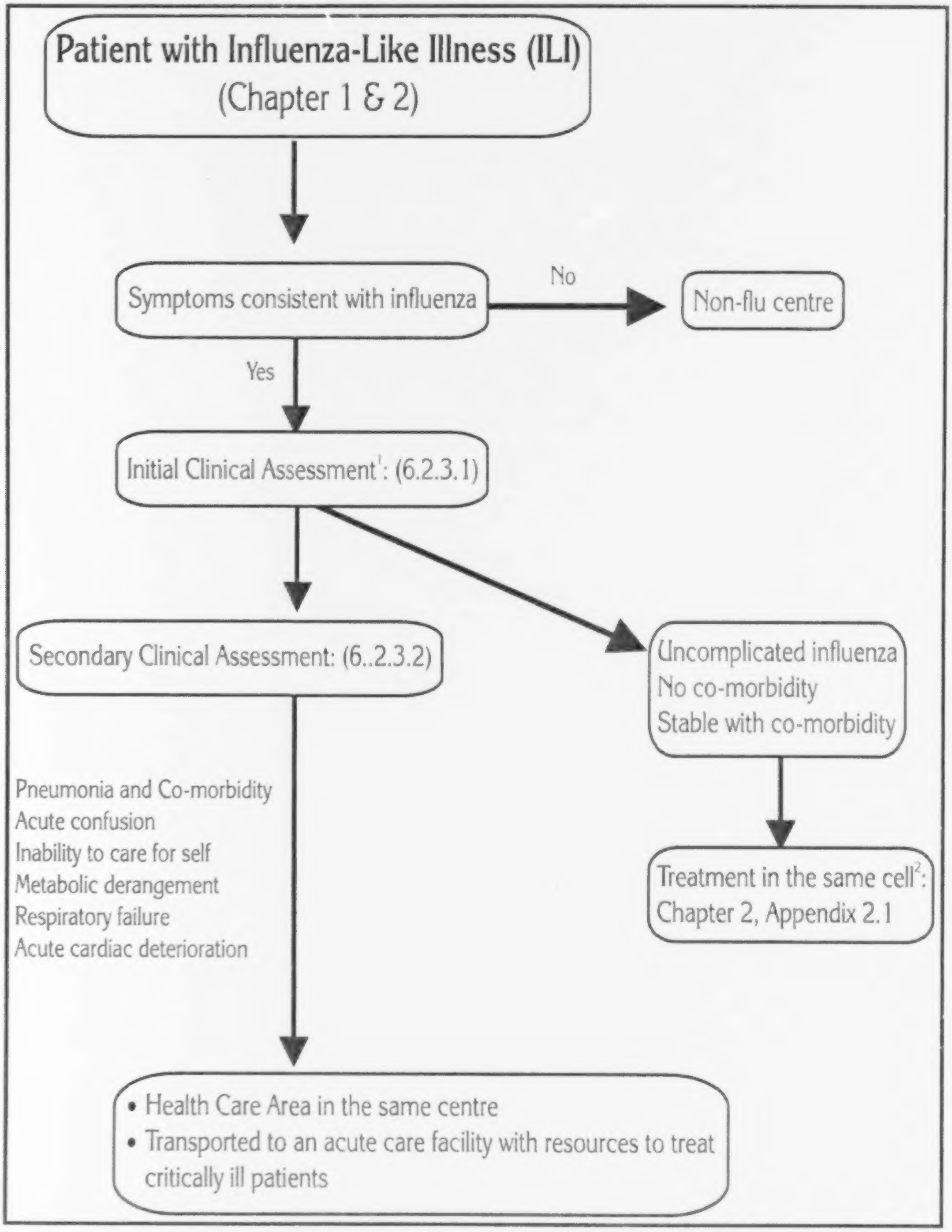
Provincial institutions can also be classified as maximum, medium, or minimum-security institutions; they provide lodging to individuals sentenced 2 years minus one day or less (about 87,000 per year, roughly 8.000 in a given day).

Health resources (this applies only to Ontario)

Provincial correctional institutions receive the regular support of registered nurses (380 nurses in Ontario, about 3 nurses per shift per institution). The number of hours of available on-site nursing care coverage varied from sixteen to twenty-four hours per day, depending on the size and location of the institution. Contracted medical care is provided in an "on call" manner.

Inmates live in cells (2 or 3 individuals per cell) or share dormitories (about 12 individuals each). It would be possible to segregate them to private/semi-private areas where they may be treated in case of influenza infection. Most institutions also have a special "health-care" area, with some beds for patients who need special attention and may be treated in the same establishment. In case of a pandemic, and provided that they receive nursing care, these beds may be useful to treat influenza patients within the same institutions. Emergencies that cannot be treated in the same institution may be referred for treatment to close community hospitals. Provincial institutions count with the same facilities available to neighbour communities.

6.2.3 Triage of patients in correctional institutions*: Federal and provincial correctional institutions


Patient with Influenza-Like Illness (ILI)
(Chapter 1 & 2)
Symptoms consistent with influenza
No
Non-flu centre
Yes
Initial Clinical Assessment[1]: (6.2.3.1)
Secondary Clinical Assessment: (6..2.3.2)
Uncomplicated influenza
No co-morbidity
Stable with co-morbidity
Pneumonia and Co-morbidity
Acute confusion
Inability to care for self
Metabolic derangement
Respiratory failure
Acute cardiac deterioration
Treatment in the same cell[2]: Chapter 2, Appendix 2.1
• Health Care Area in the same centre
• Transported to an acute care facility with resources to treat critically ill patients

Legend for Table 6.2.3

1. A special "emergency" area should be assigned for the triage, assessment and treatment of influenza patients. All patients will be evaluated following the primary assessment algorithms described in Chapter 2, and some patients more seriously ill may need further evaluation (secondary assessment, Chapter 2).
2. Some influenza patients will be able to care for themselves in their cells; Appendix 2.I. (Chapter 2) contains some helpful self-evaluation criteria and instructions for self-treatment. Other patients, however, may need more intensive care in a special area assigned for this purpose. Only critically ill patients may be transported to an acute care centre.

A goal, in the pandemic situation, will be to manage patients within the same institution without transferring them to an acute care facility. This will require that each institution designate an area for the acute care of inmates, with some monitoring and nursing care. Most large federal institutions, and some provincial institutions, already have an area for sub-acute care that can be used for this purpose in case of a pandemic.

Prior to any pandemic, correctional institutions should develop policies that will support appropriate management of inmates and personnel. The inter-pandemic epidemics suffered almost every year are excellent opportunities to develop such policies and test their efficacy. Non-compulsive vaccination of inmates in federal correction centres is performed every year, before the beginning of the "flu-season".

Pandemic preparedness should include:

a) An institutional policy for the management of influenza outbreaks.

b) Implement immunization of inmates and personnel when/if vaccine is available.

c) Plans for the establishment of an area within the facility for management of more acutely ill patients. These plans should also include 24 hours of nursing care for influenza patients who require close observation or care.

6.2.3.1 Initial assessment of patients with an influenza like illness: The initial assessment and evaluation of the inmates will include (see also Chapter 2, Table 2.1.1)

d) History: age, length of residence in the detention centre, co-morbid illnesses, documentation of previous influenza vaccinations, time of onset of symptoms.

e) Physical assessment: temperature, skin color, pulse, blood pressure, respiratory rate, peripheral edema, chest auscultation, chest pain on inspiration, mental status, function (vomiting, etc.).

f) For individuals who are clinically stable and not judged to be severely ill this may be sufficient.

6.2.3.2. Secondary assessment (Chapter 2, Table 2.1.3)

If there are concerns about metabolic status, or the degree of illness of an inmate, additional tests may be done, as required by the clinical presentation (ideally CBC with white cell count, electrolytes, blood glucose, CPK, BUN, creatinine, an EKG if there is a history of cardiovascular disease and/or evidence of significant deterioration in cardiac status). Some correctional institutions have the facilities to do blood work regularly - in some institutions it can be done daily or biweekly (depending mostly of the size and location of the institution).

Depending on the availability of resources, the determination of 02 saturation in patients severely ill will be desirable. Individuals with an oxygen saturation of (90% on room air, with new purulent sputum, or respiratory rate (30 per minute should have a chest X-Ray performed. A sputum culture may be obtained from patients who are producing sputum and appear to be severely toxic or who have pneumonia (see Chapter 2 for further guidelines).

Most federal maximum and medium institutions have X-Ray equipment and technician in place (the number of clinics per week depends of the size of the institution). Minimum-security institutions are affiliated with larger institutions with which they share the ground and some health care services such as radiography and laboratory services. Some provincial institutions also count with X-Ray equipment.

Correctional centres should have in place arrangements by which timely chest X-Rays and laboratory results may be obtained (conditional upon availability and pandemic guidelines, see Chapter 2), and should also consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

6.2.3.3 Co-morbidities

Some inmates may suffer from diseases that will increase their risk for complicated influenza, like diabetes, COPD, asthma, etc. (see Chapter 1). In addition, the percentage of offenders who smoke is very high and high rates of infectious diseases such as hepatitis C (up to 22% in some federal jails), HIV/AIDS (1.6% in some federal jails), tuberculosis, etc. are frequently observed in this population. The presence of one or more of these co-morbidities should be considered when treating or preventing influenza infections in inmates.

6.2.3.4 Instructions for the management of subjects remaining in correctional establishments

A written plan for the management of more seriously ill influenza patients who stay in the establishment should be in place in each institution. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medication (consistent with the national pandemic plan).

a) **Diagnostic and follow-up tests**: as required (conditional on availability and the national pandemic guideline, see Chapter 2):

  - Chest X-Rays
  - Blood tests, urine analysis, etc.
  - Viral/Bacterial studies: sputum, nasopharyngeal aspirate.

b) **General management**: Specific aspects of management of influenza and its complications may include:

   1. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
   2. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
   3. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids.
   4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only resources.

   1. Antiviral agents including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used attention to renal function must be assured (See Appendix 5.III).
   2. Antibiotics should be given only for the management of secondary bacterial pneumonia (abide by availability and pandemic guideline, see Appendix 5.IV).
   3. Management of preexisting disease: Cardiovascular, respiratory, metabolic, AIDS/hepatitis C, etc.

6.2.3.5 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same correctional institution; however, some patients may need to be moved to an acute care facility for more intensive treatment. The regulation of these transfers should be planned in the interpandemic period.

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H Resource Management Guidelines For Health Care Facilities During an Influenza Pandemic

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Introduction

During influenza epidemics and pandemics when the overall attack rate is relatively high, even a low frequency of complications will result in marked increases in rates of hospitalizations. Pandemic influenza usually occurs in waves lasting 6 to 8 weeks in any one location. Therefore the demand on health care services provided at health care facilities can be expected to increase, peak and decline during the weeks in which any one location is affected.

It is estimated that between 34 thousand and 138 thousand people will need to be hospitalised in Canada during the next pandemic if the attack rate is between 15% and 35%. This will put enormous stresses on all aspects of the medical system and medical resources will be stretched beyond capacity.

This document is divided into a background section and two main guidelines sections - guidelines regarding the management of resources in health care facilities, and guidelines on the need for and identification of additional human resources as part of pandemic planning activities involving health care facilities. These guidelines identify activities for the interpandemic, pandemic and post-pandemic periods.

Although these guidelines focus on resource management in health care facilities, health services are delivered in many other settings, including: triage centres; telephone health support; physician clinics; ambulance/paramedical services; patient transport services; home care; long term care facilities, and public health. In addition, "non-traditional" health care sites may be set up for the pandemic response (e.g., mobile health units, acute /subhealth care facilities). Regional and local planners will need to address resource management issues for all health services settings. Guidelines for resource management in non-traditional sites are considered in another annex of the Canadian Influenza Pandemic Plan   Annex J - Guidelines for Non-Traditional Sites and Workers.

I Background

1.1 Planning Assumptions

Current disaster plans primarily address multi-casualty, short-term, localised emergency situations. In a pandemic the impact is virtually world-wide and the duration of the "emergency" will be longer. Since multiple jurisdictions will be affected simultaneously, the sharing and exchange of resources may not be possible between jurisdictions.

For the purposes of resource planning for pandemic influenza the following assumptions have been made.

a) **It is unlikely that there will be a "Declaration of Emergency".**

Regional Pandemic Plans should not assume that a National or Provincial Emergency will be "declared", as this is unlikely to occur in the event of a pandemic.

b) **The health care system may be overwhelmed.**

There will be an increase in physician visits, hospitalizations and deaths putting the health care system under extreme stress.

- Canadian institutions are presently running at or close to maximal bed capacity and budget cutbacks and staff shortages have meant that many jurisdictions have already reduced elective admissions.
- Increasing or even maintaining existing bed capacity requires committed human resources. During a pandemic, shortages of personnel, supplies and equipment can be expected to limit the ability of institutions to respond to a significant increase in patient volume.

c) **The best use of resources will be achieved through system-wide prioritization.**

A pandemic will require a regional prioritization of needs and resources, across the health care system, not just a review of resources at a single institution. For example, in terms of human resources, health care professionals may need to be moved from vaccination clinics to hospitals or from one hospital to another. Beds, ventilators and other equipment may need to be moved to non-traditional sites. This will require a review of logistical, ethical and practical issues throughout the region.

d) **There will be limited transfer of resources.**

The global nature of the crisis will mean that resources from other jurisdictions cannot be depended upon for meeting additional requirements during a pandemic.

e) **The usual supply lines will be disrupted.**

The demand for medications, medical/surgical and other supplies will increase substantially around the world and across the country. Suppliers may experience difficulties responding to increased demand, due to staff shortages, raw material shortages and transportation disruptions. Additionally, because most medications, equipment and supplies are produced outside of Canada, there will be barriers to obtaining supplies which include embargoes of medications, cross border issues and transportation issues due to staff shortages.

f) **A pandemic vaccine may be unavailable.**

There will likely be no vaccine available until well into the first wave of a pandemic or later, depending on the time necessary to find a suitable vaccine seed strain, and for development, testing and production. When a vaccine does become available, immunization clinics targeting health care workers may need to be established inside health care facilities.

g) **Anti-influenza drugs will be in short supply.**

Currently no raw materials for anti-influenza drugs are produced in Canada. Existing supplies are very limited and insufficient to form the basis for an effective antiviral response strategy. Stockpiling of these medications is being considered.

When and if antivirals drugs are made available, treatment and prophylaxis for people seeking health care services at health care facilities will need to be prioritised according to national recommendations.

h) **The number of essential service workers will be reduced.**

The availability of health care workers, and service providers essential to limiting societal disruption during a pandemic, may be reduced due to illness in themselves or family members.

i) **The pandemic will occur in waves.**

The pandemic will likely occur in successive waves of approximately six to eight weeks duration in any one community followed by a recovery period of unknown duration. Between the waves substantial resources will be required to "catch up" with elective procedures, delayed treatments for cancer or cardiac care and other treatments. Maintenance on equipment, restocking of supplies, and other activities necessary to recover and prepare for another pandemic wave will need to occur during this time frame.

1.2 Projecting the Impact

No one can predict how serious the impact of the next influenza pandemic may be. Current Canadian estimates have been calculated based on attack rates for symptomatic illness of 15% and 35%, however, higher attack rates are possible. Local estimates of the potential impact of a pandemic (the number of ill persons, the number of hospitalisations, number of deaths, etc.) can be projected using software programs, e.g., the "FluAid" software developed by the Centers for Disease Control and Prevention in the U.S. (http://www2.cfdc.gov/bd/fluai Hlt13977776d Hlt13977776/default.htm).

This software presents some challenges and has some limitations based on the fact that it is geared to the U.S. health care system and health seeking behaviours, which may be quite different from Canada. Currently there are no reliable tools for estimating rates of intubation, which would assist in planning for equipment such as ventilators. An example of how one province, Alberta, has used FluAid is provided as Annex A in the Preparedness Section of the Plan.

2 Resource Management in Health Care Facilities

2.1 Resource Management During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below this list.

- Review emergency preparedness legislation
- Identify triggers for intervention
- Planning for increased bed capacity
- Plan for patient prioritisation
- Plan for critical equipment and supplies

2.1.1 Review Emergency Preparedness Legislation

Emergency Preparedness Legislation makes many provisions for the management of a crisis, obtaining and accessing materials, and other resources, implementation of crisis plans and also provides for a crisis management structure. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency legislation as well as emergency plans of the jurisdictions in order to make best use of existing plans and resources.

Important Note: Regional Pandemic Plans should not assume that a National or Provincial Emergency will be "Declared", as it is highly unlikely to occur in a pandemic. Provincial and territorial planners should assess issues such as workers compensation and liability insurance, maintaining and supporting workers and other aspects of the plan that may arise without such a declaration.

The national support framework is not contingent upon a declaration of a national emergency. It is recommended that all provincial and territorial planners review both the Federal and the Provincial/Territorial Emergency legislation to determine how to integrate plans within the framework of emergency legislation.

For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- the ability and responsibility of authorities to requisition property for use as Non-Traditional Sites,
- access to transportation, materials, administrative staff and other resources, and
- compensation for requisitioned property.

2.1.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Canadian Pandemic Influenza Plan will also describe general points of action.

In co-ordination with existing legislation and plans, Provincial/Territorial, Regional and Local authorities and institutions should identify key criteria and methodologies that would trigger the phased implementation of plans regarding resource management activities in their jurisdiction. The local medical officer of health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction.

Since it is unlikely that the pandemic will start in Canada, the first trigger may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Canada in terms of demand for health care services.

Local health care resources and local disease epidemiology, for example, the number of confirmed influenza cases in the community, or data on the impact of pandemic influenza on other Canadian jurisdictions, will determine the triggers for health services emergency plans. These triggers may include:

- The proportion of emergency room visits attributable to influenza.
- The proportion of influenza cases requiring hospitalisation.
- The capacity of the hospital to accommodate influenza cases.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for reallocation or acquisition of resources. The trigger points and surveillance protocols should be defined during the interpandemic period.

Federal, Provincial/Territorial, Regional and Local authorities and institutions may designate points at which the following specific actions are taken.

- Changing staffing ratios, job duties
- Reducing surgical slates, admissions
- Consolidating services
- Procuring additional supplies
- Calling on alternative staff
- Re-routing of ambulances

2.1.3 Planning for Increased Bed Capacity

In any institution a "bed" includes infrastructure support, including staffing, which is required to care for the patient in that "bed". Therefore the requirements for a "bed" in an intensive care unit, for example, include all the support required for a patient to be cared for at that level.

Planning to increase bed capacity during a crisis includes:

- identifying the strategies in advance,
- planning for the consequences of these strategies, and
- identifying trigger points at which the options will be implemented.

Various options to increase bed capacity have been identified, including:

- reducing elective admissions and surgeries to maximise medical bed capacity, and to maximise critical care beds,
- changing protocols or requirements for early discharge,
- increase home care staffing,
- increase the number of residential beds, long-term care and hospice beds,
- re-opening capacity currently closed,
- using reserved critical care capacity,
- using emergency ventilation facilities in recovery and operating rooms,
- assessing associated sites such as clinics, extended care facilities and psychiatric facilities for use by non-influenza patients, and
- creating "flex" beds during the influenza season.

Programs that track and manage Bed Capacity such as the Ontario Critical Program and Ontario Resource Registry, British Columbia's "Bedline" and Alberta's Call Centre System play a key role in the transfer/placement of critical care patients across the province, thus ensuring that staffed beds are used to maximum advantage. The Resource Management subgroup has recommended that each Province/Territory create a centralized bed registry, call centre and centralized ambulance dispatch.

Appendix A of this document includes checklists to assist in evaluating bed capacity in health care facilities.

2.1.4 Plan for Patient Prioritization

During a pandemic it will be a challenge to manage high ward and intensive care unit censuses, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment.

The pandemic may have a first wave of approximately 6 to 8 weeks and there may be one or more subsequent waves. Cancellation of elective admissions and surgeries, as a way of managing limited resources, could have serious consequences for some patients, including cancer and cardiac patients. Since elective surgeries are not all equivalent in terms of necessity and risks of delay, health authorities must consider within their Province/Territory, region, municipality and/or facility how patients scheduled for elective admissions/surgeries will be prioritized if beds are limited.

Prioritization of health resources at times of critical shortages will also need to be considered. Local community-based centres and hospitals need to take a multi-disciplinary approach and include ethical and legal considerations when developing any prioritization processes. The Clinical Care Guidelines (Annex G in the Canadian Influenza Pandemic Plan) provide recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or co-morbidities. However, if supplies, equipment, and access to intensive care must be rationed, a fair and equitable prioritization process will need to be established.

A general approach to ethical considerations will be developed by the national pandemic planning working groups. This will require further discussions including ethics and public consultations. With the ethical considerations and goal of the pandemic response in mind, each community will need to make their own decisions on prioritization, depending on the availability of resources, stage of the pandemic in the community and management decisions made up until the point that rationing/prioritization becomes necessary. Since there are so many variables and contingencies, it is highly unlikely that a nationally developed guideline would be detailed enough to meet the needs of those involved in these types of decisions at the local level.

2.1.5 Plan for Critical Equipment and Supplies

A pandemic will likely result in shortages of medications, medical supplies, and potentially, operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting Canadian supplies will be:

- *Interrupted transportation lines* — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.
- *Lack of inventory* — In an effort to reduce costs, most health regions have moved to "just-in-time" inventory systems that keep minimal supplies on hand.
- *Embargoes* — The majority of medical supplies are not produced in Canada. Health Canada has made major efforts to establish a domestic infrastructure for the manufacturing of influenza vaccine and has encouraged in-Canada manufacture of some antibiotics. However in many cases supplies are provided by only one or two manufacturers worldwide, or the essential ingredients or components come from a single source. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies.

Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other annexes. Other resources such as the Infectious Diseases Society of America (IDSA) Guidelines lists medications considered to be critical in the treatment of influenza and pneumonia. These guidelines should be distributed to and reviewed by health care facilities during the interpandemic period since these issues will affect the management patients and resources, including medications, within the facility.

Stockpiling

Provinces/Territories and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for health care facilities within their own jurisdictions. Jurisdictions may specifically wish to keep some older equipment such as beds, which need little maintenance and have no specific "shelf life". Appropriate assessment should be made of the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc. (See Appendix B for supply management checklist)

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators.

The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be address at the P/T and local levels. In addition, provinces and territories will have to discuss with local pandemic planners the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g., chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. The Clinical Care Guidelines (Annex G) provide guidance on antibiotics for the treatment of secondary pneumonia. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

Local Production

During a crisis some items, which are usually ordered from centralized sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

2.2 Resource Management During the Pandemic Period

Prior to the onset of the pandemic it not known which populations will be most affected by the novel virus, and what the prominent symptoms of the disease, and the most common complications will be. Once the WHO has identified a "Novel Virus" and confirmed "Human to Human Transmission", this information will gradually become available. Planners should review the epidemiology of the disease in light of the demographics of their own population and in terms of their existing resources and revise plans for the allocation of resources based on this information.

The following activities, with respect to health care facilities, should occur during this phase of the pandemic when the triggers indicate the need for action.

- Implementation of emergency plans.
- Increase bed capacity.
- Review critical equipment and supplies.

2.2.1 Implementation of Emergency Plans

Based on the previously identified triggers for action and existing legislation and plans, the phased implementation of pandemic response plans will be initiated at this time.

2.2.2 Increase Bed Capacity

To increase bed capacity, based on the plans made during the interpandemic period, the following activities may occur during the pandemic:

- re-open closed wards and hospitals,
- cancel elective surgeries and admissions based on the prioritization process determined earlier,
- centralize the tracking of bed capacity,
- use of reserved critical care capacity,
- preparation and use of emergency ventilation facilities in recovery and operating rooms,

- cohorting infectious and non-infectious patients in alternative sites such as clinics *or extended care facilities, and*
- discharge as many patients as possible based on revised criteria for discharge.

Provinces and territories should review and consider any existing legislation that may put restrictions on patient and staff movement.

2.2.3 Review Critical Equipment and Supplies

Review and revise supply needs and plans based on WHO and Health Canada epidemiologic projections.

- Order additional supplies.
- Establish alternate transportation/distribution arrangements if required.
- Establish domestic production of supplies where possible.

Health Canada or other authorities will notify jurisdictions of the status of stockpiles, embargoes, and emergency production facilities. Vaccine and antiviral supplies and recommendations on their use in times of shortages will be co-ordinated at the national level.

2.3 Resource Management During the Post-Pandemic Period

Activities at health care facilities during this pandemic phase will focus on the implementation of recovery plans to return the facility to its normal, interpandemic, operating state. Beds may be closed and additional supplies acquired during the pandemic may be return or put into storage. The pandemic response should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

3 Guidelines for Human Resource Management in Acute Care Settings

3.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings within an acute care facility or expansion of the services usually provided at these facilities (e.g., to include immunization clinics for health care workers). In addition, non-health care workers or retired health care workers may need to be hired/contracted to provide supplementary services essential to meet the demand for services at health care facilities. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and non-traditional sites must be established or current service sites expanded. Human resource management at non-traditional sites during a pandemic is addressed in the Guidelines for Non-Traditional Sites and Workers, Annex J of the Plan. This section of the document will therefore focus on human resource issues in acute care settings.

3.2 Human Resource Management During the Interpandemic Period

Health authorities may make preliminary estimates of staffing needs based on estimates of the impact of a pandemic and the demographics of the region (see Section 2.1).

The following list of activities is provided to assist with planning for the optimal use of human resources, including health care workers, trainees, retirees and volunteers, at health care facilities. Further details are provided in the following sections.

- Plan for optimal use of health care workers and volunteers
- Review emergency legislation pertaining to health care workers and volunteers
- Provide training
- Consider insurance and licensing issues
- Immunization of Health Care Workers, including volunteers
- Plan for support for Health Care Workers, including volunteers

3.2.1 Plan for Optimal Use of Health Care Workers

The work involved in identifying current health care workers who could be re-located within an institution and recruiting additional health care professionals, other health care workers and volunteers that could offset some of the increased demands on health care workers that will occur during a pandemic, should be initiated during the interpandemic period.

a) **Appoint a human resource management team**

Identifying current health care workers; recruiting additional professionals, non-professionals and volunteers; and managing the training, assignment and support of health care workers to various locations and tasks will be some of the most important pandemic preparedness tasks. Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, infection control, occupational health and safety, and volunteer organizations would be desirable for this planning team/subcommittee.

b) **Placement of personnel**

During a pandemic health care workers may need to be reallocated from their usual roles and settings. For example, trained, health care professionals, may be required to expand their role to include the supervision of volunteers and other staff in the acute care settings, affiliated clinics and non-traditional sites.

While it is likely that all health care workers will be needed at their usual acute care facility, consideration should be given as to the source of staff for other sites including:

- Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital.
- Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.
- Vaccination Clinics –clinics in acute care sites, etc.

The Guidelines for Non-Traditional Sites and Workers (Annex J) address many of the human resource issues involving these sites. However, it is important to recognize that the expertise needed for the clinical management of influenza patients predominantly resides within the health care facilities. Positioning some staff at these sites may offset the demands on the health care facilities and ultimately lead to the optimal use of human resources.

Health authorities must review the needs of their own communities to determine whether more emphasis should be placed on supporting community care options and which staff will be needed where.

c) **Review scopes of practice**

Even in acute care settings, delegation of tasks and authority will, by necessity, change during a pandemic. A shortage of staff and increase in the number of patients may necessitate cancellations of surgery, tests and other procedures. Staff may be reassigned from their usual roles to make best use of their skills. Retired and foreign-trained personnel may be asked to step in.

Negotiations and planning must take place within each province and territory, with existing colleges, associations and insurers in order that the process of reassignment and delegation may take place quickly and as smoothly as possible. (See the section on Emergency Preparedness Legislation.) Prior negotiation with licensing bodies and bargaining units to facilitate changing of job descriptions and the use of alternative workers during a pandemic will ease the transition and make the process more efficient. In the interpandemic period we recommend the jurisdictions take the following actions:

- Establish a process, in conjunction with existing emergency plans, to assess the work needed and skills required for each task. Jurisdictions need to look at the process of intake, reception, triage, clinical care, clean up, etc. and assess additional workers or sources of workers who already have the skills to be slotted into these jobs.

- Review the recommendations on patient assessment and management in the Clinical Care Guidelines which will indicate the needs for various skills at various points in patient care, and determine who may provide those during a pandemic.
- Communicate with health care professionals about pandemic needs.

d) **Recruit professional staff for the pandemic response**

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

- retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)
- physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)
- trainees (i.e., medical students and nursing students)
- registered nursing assistants
- patient care assistants
- emergency medical technicians
- veterinarians
- pharmacists
- therapists (respiratory/occupational/physio)
- technicians (laboratory, radiography)
- health care aides

Consider how best to recruit persons with health care qualifications but not currently working in the health services. Work with professional associations to determine how to communicate with their members prior to the pandemic about pandemic issues, and how they might communicate during the pandemic.

Provinces/Territories may work with professional associations to ensure that persons with health care qualifications but not currently working in the health services maintain their qualifications and competencies. It is also important to establish a method for assessing professional qualifications and competence during the pandemic when people are being hastily recruited.

Developing and maintaining databases of staff is a time consuming and expensive task. Databases are only useful if kept up to date with licensing, skill set and contact information.

Most health care facilities will already have some type of database of their staff. Local facilities or authorities may wish to develop databases of workers with specific training (through licensing bodies and associations) or establish a co-operative arrangement with licensing bodies, associations or volunteer agencies that already maintain these lists.

Provinces/Territories are encouraged to review professional and privacy legislation to determine how best to maintain such lists. It may be most appropriate both legally and effectively to ask professionals to volunteer their names as pandemic workers. It may also be appropriate to provide some form of incentive in the form of free training, subsidized license fees etc. to encourage professionals to volunteer their names.

Develop methods to ensure:

- Qualified workers can be contacted quickly and easily,
- Workers are placed where they are needed most, and
- Workers' training and qualifications are on record to ensure people have appropriate qualifications.

3.2.2 Review Emergency Legislation Pertaining to Health Care Workers

Emergency Preparedness Legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. There is no assurance that a national emergency will be declared; jurisdictions should be prepared to operate under either condition. Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;
- safety and protection of workers, (one of the primary responsibilities);
- fair compensation;
- insurance, both site insurance, workers compensation and other forms of insurance;
- training;
- provision of clothing and equipment;
- protection of the jobs of workers who take leave to assist during the crisis.

Compelling Workers

Under Emergency Legislation provinces/territories may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort.*

This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the Subgroup notes the extreme difficulty of enacting or enforcing such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining health care workers, in advance of a pandemic.

3.2.3 Provide Training

Health Care professionals, both those currently working in their fields and those working elsewhere or retired, as well as volunteers may benefit from training and communication regarding pandemic plans. As well as looking at specific skills, training and communication may focus on preparedness, changing roles and responsibilities, supervising volunteers, crisis management and emergency planning.

a) **Start training and awareness building now**

There will be very little time for effective training, once a pandemic is underway. Therefore, training should be incorporated into existing programs provided during the interpandemic period. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness.

Training and awareness building will be needed in order to:

- motivate development of a response capacity, including identification of responsibilities and preparation activities, in acute care settings,
- facilitate an understanding of pandemic consequences, vaccination and ethical issues, among health care providers, prior to the pandemic,
- recruit workers willing to take on new responsibilities during the pandemic
- encourage health care workers to maintain skills and licensing while working elsewhere, and
- to develop specific skills related to pandemic influenza.

b) **Identify skill/knowledge requirements**

Health care workers will need to be skilled and knowledgeable in the fields of infection control, crisis management, worker supervision and working with grieving families, which may not be a significant part of their current responsibilities. In addition, it would be useful to expand and maintain the number of health care professionals and others with training in oxygen therapy and the use of ventilators and care of patients on ventilators.

Clerical skills in terms of patient tracking procedures will also be needed in overwhelmed health care facilities, as will people who can train patients and families in "self-care" thereby facilitating early discharge of patients. Ideally all health care workers should be trained in the principles of self-care, since they will be the primary conduit of information to their patients, families and communities. (See Clinical Care Guidelines and Tools Annex in the Plan for more information on self-care).

However, it is recognized that because of the difficulty of maintaining many of these skills without constant use, training programs targeting these skills should be developed for quick and efficient implementation once a pandemic is declared.

It is also advisable to develop a plan specifically for training or re-training of health care workers who are not currently working in health care, for example retirees.

c) **Train the trainer**

Health authorities and existing volunteer agencies, may establish programs to "train the trainers". Through this process a pool of trained individuals can be maintained, during the interpandemic period, that would be available to implement training programs as quickly as possible at the onset of a pandemic.

To facilitate this process it would be essential to:

- identify and train those with knowledge of the tasks and adequate communication skills to act as trainers during the pandemic,
- identify training resources of use to on-the-job trainers,
- ensure there are adequate, easy to use procedures/instruction manuals for tasks such as admissions, patient tracking, etc., and
- use and share existing training programs and materials which can be adapted for pandemic influenza.

d) **Plan now for training during the pandemic period**

A great deal of training will have to be done once a Pandemic is declared. Staff not currently working in health care and volunteers may only come forward once a pandemic is declared. In addition, it may be necessary to update training closer to the pandemic period. In order to ensure that this is done swiftly and efficiently during the pandemic, the following preparations should be made in advance:

- identify training which will take place following the declaration of pandemic,
- identify and obtain training resources which can be tested and used during the pandemic period,
- train the trainers -(see above), and
- plan for where and how training will be delivered during the pandemic.

3.2.4 Consider Insurance and Licensing Issues

Insurance and liability coverage should be provided for trainees, volunteers, retirees and any other workers that are recruited to provide health care services during a pandemic. A more in-depth treatment of insurance and liability issues may be found in the annex on Non-Traditional Sites and Workers (Annex J). While these issues will be investigated at the national level, each province/territory will need to review existing legislation and policies to determine how this might be accomplished in their respective jurisdictions.

a) **Liability/insurance for workers and volunteers**

The need to expand scopes of practice may have implications for liability protection/malpractice insurance.

b) **Workers' compensation**

A Memorandum of Understanding (MOU) between the Office of Critical Infrastructure Protection and Emergency Preparedness (formerly Emergency Preparedness Canada), and the Provinces/Territories asserts that registered volunteers or persons compelled/conscripted for emergency service work are protected by workers' compensation during emergency response, as long as they are registered. Some volunteer agencies, have a liability policy for their volunteers.

In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under emergency legislation. However, there are a number of issues to be resolved with workers compensation boards at the provincial level:

- Does the policy require a declaration of Emergency and, at what level of government, or would the insurance come into effect once Minister of Health declares a pandemic?

- Definition of health care workers for this purpose.
- Definition of volunteers for this purpose.
- Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?
- Would compensation be available if volunteers became ill rather than injured?
- Does this include Death and Dismemberment insurance?

Ensure such insurance is available independent of the need for a "Declaration of Emergency."

c) **Transfer of licensing between jurisdictions**

(This section is under review pending discussion with provincial and territorial licensing organizations.)

Each province/territory needs to liase with professional licensing bodies in their jurisdiction during the interpandemic period regarding licensing issues. In addition, professional licensing bodies may be asked to liase and extend privileges to out of province professionals, based on their standing in another jurisdiction.

3.2.5 Immunization of Health Care Workers

While it is unlikely that a vaccine for the pandemic strain of influenza will be available in advance of the arrival of the pandemic in Canada, health care workers should be up-to-date with the other routinely recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Once a pandemic vaccine becomes available the vaccine will be distributed according to nationally agreed upon recommendations for prioritisation of vaccine recipients. A preliminary list of priority groups has been developed by the Vaccines Sub-group and is provided in Annex D of the Plan. The priority and composition of these groups may change based on the epidemiology of the pandemic. However it is widely recognized that health care workers are critical to the pandemic response and should be considered high priority for immunization during a pandemic.

3.2.6 Supporting Health Care Workers

During a pandemic, health care workers will need considerable personal support in order to keep working. During the interpandemic period, it is important to plan for how these services may be provided. Some strategies may require changes in policy, or even in legislation to ensure the availability of health care workers during the pandemic. Support provided to health care workers may include:

- Basic Personal support – ensure food and services are available to health care workers on the job.
- Emotional support/Grief Counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).

- Family Care (for children, seniors, sick family members who do not require hospitalization). This poses significant infection control concerns if gathering children or the elderly together for group care.
- Job protection for HCWs who move from other jobs during pandemic.
- Job protection for spouses who do family care to allow HCWs to work in health care.

In order to develop crisis programs, health authorities may build on existing employee support programs. This may involve:

- contacting existing support services,
- working with Chaplains, counsellors and grief counsellors to develop crisis support programs including grief support and traumatic stress counselling,
- determining whether child, or family care, programs would be appropriate for the site(s) and where and how they would be set up (eg. Contract with YM/YWCA), and
- reviewing legislation to determine if there is protection for spouses who take on child care responsibilities to permit health care workers to continue to work.

3.3 Human Resource Management During the Pandemic Period

If the pandemic arrives in other countries prior to arriving in Canada, information on the epidemiology of the pandemic strain will be circulated internationally as it becomes available. Planners will need to consider each piece of new information in terms of how this might impact their own population and potentially revise plans for the allocation of human resources based on this information.

The following steps/actions will need to occur during the pandemic period to optimise the human resource dependent response:

- organize the deployment of health care workers
- work with emergency management personnel and use emergency preparedness legislation as required
- implement training and communication plans
- manage insurance and licensing issues
- address immunization needs
- support health care workers

3.3.1 Organize the Deployment of Health Care Workers

At this point it will be necessary to activate the Human Resource Planning Team and recruit new members that may be vital to the implementation of previously developed plans. This will facilitate the coordinated management of human resource issues. Next steps are listed below.

- Identify key and supervisory positions and the people to fill them.
- Based on current staffing levels, and assuming a similar attack rate for staff as for the rest of the population, estimate additional staff needs for each region.
- Reassign staff where necessary.
- The Team, in conjunction with the local health authority, should update the inventory of current staff, number of beds, and acute care settings.
- Review worker and volunteer databases established in the interpandemic period.

- Call for staff - Communicate with the public and with health care workers that are not currently working, regarding the possible need for additional staff.
- Screen additional staff.
- Train - existing staff in special tasks and train additional staff.
- Deploy staff.

3.3.2 Coordinate Response with Emergency Management Personnel

During a Pandemic the relationship between Emergency Measures Organizations and personnel, and medical authorities and personnel will determine the overall response to the crisis. The best deployment of health care workers and other essential workers will result from well established, coherent communication between Emergency Preparedness Personnel and Health Authorities.

Advance planning should focus on establishing communication strategies and protocols which will permit on-going direct, daily integrated communication during the period of the pandemic. Knowledge and implementation of existing legislation, strategies and resources and a transparent means of communicating with health care workers and other essential workers, as well as the public will permit authorities to efficiently implement adequate human resource management strategies during the crisis.

3.3.3 Implement Training and Communication Plans

During the pandemic period staff and volunteers will be identified who need additional training. This will include training such as: working with ventilated patients, and basic support skills such as sterilization procedures, management of admissions etc. to permit licensed trained health care workers to take on additional tasks. It is vital that the training be quickly and easily available in formats that are short, manageable and preferably "on-the-job" where possible.

- Identify experienced people, those with knowledge of the tasks and adequate communication skills and provide them with resources to permit them to train others. (See Train the trainers above.) Ensure trainers and experienced people remain available for consultation and training on an on-going basis.
- Review training programs and emphasize skill sets based on the epidemiology of the disease.
- Use the time between the WHO/Health Canada declaration of pandemic, and the arrival of the first wave in the jurisdiction to train as many staff and volunteers as possible in general and specific tasks.
- Call on existing agencies such as St. John Ambulance and the Red Cross to ramp up existing training programs with an emphasis on tasks required to treat influenza patients.
- Maintain records of trained individuals to ensure best deployment of those individuals.

3.3.4 Manage Insurance and Licensing Issues

It will be important to communicate any necessary changes to licensing and insurance provisions to all stakeholders. This will require a thorough review of provisions for insurance in the provincial/territorial emergency plan, a review of licensing issues and communication with licensing bodies, associations, colleges, etc. regarding this issue.

If insurance and/or licensing arrangements require activation of some form of legislation, bylaw or declaration, inform the Minister of Health and other appropriate authorities.

Inform Chiefs of Staff, Managers, Supervisors and Human Resource professionals in health care settings, of changes in licensing and insurance and what that will mean for flexibility in staff deployment, additional staffing, requirements for deployment, or any other provisions of legislation, licensing or insurance with which the institution must comply.

3.3.5 Address Immunization Needs

Health care facilities may have to provide qualified personnel capable of administering immunizations, under the guidance of public health authorities, to staff clinics targeting staff and volunteers at their site.

3.3.6 Support Health Care Workers

Review plans made during the interpandemic period to provide support to all health care workers including volunteers and retired persons, to enable them to continue working. During the pandemic authorities may:

- Establish personal support services providing on-site food delivery, nap rooms, etc.
- Set up counselling services (find an office, determine a schedule).
- Call in additional counsellors, grief counsellors, chaplains, clergy, clerical support.
- Set up child/family care services.
- Notify staff of how to access these services.
- Notify staff of legislated protections such as protection for job of spouse while caring for children.

3.4 Human Resource Management During the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. The pandemic response, in terms of human resources, should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

Consideration should be given to methods to formally recognize the efforts of all workers involved in the pandemic response.

Appendix A
Evaluation of Bed Capacity

These worksheets have been designed to assist facilities in planning for an influenza pandemic. It can be used to complement centralized bed management systems, or used on their own to evaluate bed capacity and how to achieve maximum bed utilization. Facilities should determine the maximum number of beds available and the numbers of hours of care needed to staff the beds. During an influenza pandemic there would most likely be a change in acuity of beds.

Who has responsibility for collecting this information? (Check your facility's emergency plan.)
Position Title

Who will have authority and responsibility to apply this information during a Pandemic?
Position Title

1. What is the total number of non-ventilated beds, **without** oxygen supply, which are:

a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term?	In 72 hours	In 7 days

What are the limiting factors (staffing, equipment, physical space, other)?

2. What is the total number of non-ventilated beds, **with** oxygen supply, which are:

a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term?	In 72 hours	In 7 days

What are the limiting factors (staffing, equipment, physical space, other)?

3. What is the total number of ventilated beds which are:		
a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term?	In 72 hours	In 7 days
What are the limiting factors (staffing, equipment, physical space, other)?		

4. If a directive came to stop all elective surgery/admission:	In 72 hours	In 7 days
a) How many beds would become available?		
b) How many beds, with oxygen supply, would become available?		
c) How many ventilated beds would become available?		

5. How many extra emergency ventilatory beds could your hospital create? [NB. Consider use of all ventilator capacity, including time-cycled ventilators, anaesthetic machines, CPAP, BiPAP, and the availability of oxygen/suction and air-supply, recovery and operating rooms and neuroscience beds.]	In 72 hours	In 7 days
a) Assuming current staffing levels (redeployment of staff permitted)		
b) Assuming additional resources for staffing:		
What are the limiting factors (staffing, equipment, physical space, other)?		

6. Does your hospital have any excess capacity to assist other health care facilities or the community, such as provisions of meals, sterilization capacity?

7. Does your hospital have an affiliation with a Health Care Facility, which may have extra bed capacity?

Affiliation	Number of Beds
› Number of Beds	
› Long-Term Care Facility	
› Acute Detoxification Unit	
› Rehabilitation Facility	
› Crisis Unit	
› Other Type	

Inventory of Beds (Work Sheet)

Type of Bed	Total number of physical beds in facility	Number of physical beds with oxygen supply	Number of currently operating beds (opened and staffed)	Number of currently operating beds with oxygen supply	Estimate current proportion of elective vs emergency cases/beds	Number of beds able to be staffed using current resources	Space for beds available, with oxygen outlet, no physical bed available	Space for beds available, no oxygen outlet no physical bed available	Comments (e.g., unique equipment, special purpose)
Medical									
Special medical/Step Down									
Surgical									
Special surgical									
Coronary care*									
Intensive care*									
Paediatric									
Obstetric									
Special Care Nursery									
NICU									
Day ward									
Recovery room*									
Sleep laboratory									
Closed wards									
Other									
TOTAL									

* denotes areas currently used for ventilation which could be used for emergency ventilation

Inventory of Ventilators (Work Sheet)

Types of ventilators	Intensive Care	Coronary Care	Special medical/ stepdown	Recovery room	Operating room	Emergency department	Storage	In repair	Sleep study laboratory	Physio-therapy	Other
Oxylog											
Bird											
CPAP spont. breathing											
BiPAP spont. breathing											
TOTAL											

Emergency ventilatory capacity considerations (Work Sheet)

Property	Intensive Care	Coronary Care	High dependency	Recovery room	Operating room	Emergency department	Neuro-science	Sleep study laboratory	Other
Suction									
Oxygen outlet									
Medical air outlet									
Airflow (negative pressure)									
Airflow (positive pressure)									
Room monitoring									
Physical bed									
Space, but no physical bed									

Appendix B: Example Supply Management Checklist

Operational Period ____________ Date Prepared ____________ Prepared By ____________

Location Required	Facility	Item and Unit Size	Shelf life	Have	Need	Stockpile/ Location	Supplier Name/ Location	Issues Affecting Supply* & Alternate Arrangements

***Issues Affecting Supply**

- Interrupted transportation lines — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect supplies.
- Special storage or transportation requirements (e.g., Cold Chain).
- Just-In-Time Inventory — Supplies can be obtained but may take some time.
- Embargo — If the item is not produced in Canada is it an item which is likely to be embargoed.

I Guidelines for the Management of Mass Fatalities During an Influenza Pandemic

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Introduction

During a pandemic, local authorities will have to be prepared to manage additional deaths due to influenza, over and above the number of fatalities from all causes currently expected during the inter-pandemic period. Within any locality, the total number of fatalities (including influenza and all other causes) occurring during a 6- to 8-week pandemic wave is estimated to be similar to that which typically occurs over six months in the inter-pandemic period. This guideline aims to assist local planners and funeral directors in preparing to cope with large-scale fatalities due to an influenza pandemic. A number of issues have been identified, which should be reviewed with coroners/medical examiners, local authorities, funeral directors, and religious groups/authorities.

1.0 Planning for Mass Fatalities

In order to identify planning needs for the management of mass fatalities during a pandemic, it is important to examine each step in the management of a corpse under normal circumstances and then to identify what the limiting factors will be when the number of corpses increase over a short period of time. The following table identifies the usual steps. Possible solutions or planning requirements are discussed in further detail in the sections that follow this table.

Table 1: Usual Process for Corpse Management

Steps	Requirements	Limiting Factors	Planning for Possible Solutions/Expediting Steps
Death pronounced	› person legally authorized to perform this task	› if death occurs in the home then one of these people will need to be contacted › availability of people able to do this task	› provide public education re. how to access an authorized person › consider planning an on call system 24/7 specifically for this task
Death certified	› person legally authorized to perform this task	› legally, may not necessarily be the same person that pronounced the death	› consider "collecting" corpses and having one authorized person perform this task en masse to improve efficiency
Body wrapped	› person(s) trained to perform this task › body bags	› supply of human and physical (body bags) resources › if death occurs in the home: the availability of these requirements	› consider developing a rotating 6 month inventory of body bags, given their shelf life › consider training or expanding the role of current staff to include this task › provide this service in the home in conjunction with pronouncement and transportation to morgue

Steps	Requirements	Limiting Factors	Planning for Possible Solutions/Expediting Steps
Transportation to the morgue	› in hospital: trained staff (orderly?) and stretcher › outside hospital: informed person(s), stretcher and vehicle suitable for this purpose	› availability of human and physical resources	› in hospital: consider training additional staff working within the facility › consider keeping old stretchers in storage instead of discarding › look for alternate suppliers of equipment that could be used as stretchers in an emergency e.g., trolley manufacturers › outside hospital: provide public education or specific instructions through a toll-free phone service re. where to take corpses if the family must transport
Morgue storage	› a suitable facility that can be maintained at 4 to 8 degrees Celsius	› capacity of such facilities	› identify and plan for possible temporary morgue sites
Autopsy if required/ requested	› person qualified to perform autopsy and suitable facility with equipment	› availability of human and physical resources › may be required in some circumstances	› ensure that physicians and families are aware that an autopsy is not required for confirmation of influenza as cause of death
1) Cremation*	› suitable vehicle of transportation from morgue to crematorium › availability of cremation service › a cremation certificate	› capacity of crematorium/speed of process › availability of coroner or equivalent official to issue certificate	› identify alternate vehicles that could be used for mass transport › examine the capacity and surge capacity of crematoriums within the jurisdiction › discuss and plan appropriate storage options if the crematoriums become backlogged › discuss and plan expedited cremation certificate completion processes
2) Embalming**	› suitable vehicle for transportation from morgue › trained person › embalming equipment › suitable location	› availability of human and physical resources › capacity of facility and speed of process	› consult with service provided regarding the availability of supplies and potential need to stockpile or develop a rotating 6 month inventory of essential equipment/supplies › discuss capacity and potential alternate sources of human resources to perform this task e.g. Retired workers or students in training programs › consider "recruiting" workers that would be willing to provide this service in an emergency

Steps	Requirements	Limiting Factors	Planning for Possible Solutions/Expediting Steps
Funeral service	› appropriate location (s), casket (if not cremated), funeral director	› availability of caskets › availability of location for service and visitation	› contact suppliers to determine lead time for casket manufacturing and discuss possibilities for rotating 6 month inventory › consult with the FSAC to determine surge capacity and possibly the need for additional sites (e.g., use of churches etc. for visitation)
2a) Transportation to temporary vault or burial site	› suitable vehicle and driver	› availability of human and physical resources	› identify alternate vehicles that could be used for this purpose › consider use of volunteer drivers
2b) Temporary vault storage	› access to and space in a temporary vault	› temporary vault capacity and accessibility	› expand capacity by increasing temporary vault sites
2c) Burial	› grave digger, space at cemetery	› availability of grave diggers and cemetery space › extreme cold and heavy snowfall	› identify sources of supplementary workers

* cremated bodies are not usually embalmed; families may choose to have a funeral service followed by cremation or to have the body cremated first and a memorial service later.

** bodies to be buried may be embalmed and may need to be stored in a temporary vault prior to burial.

1.1 General Planning Considerations

In order to develop guidelines or adjust existing plans to suit the pandemic situation, local pandemic planners should ensure that the following persons are involved in mass fatality planning:

- the Coroner Office/Branch,
- the Medical Officer of Health,
- the Emergency Response Team,
- representatives of the Funeral Services Association of Canada (FSAC) and/or the local funeral director,
- representatives from local health care facilities, and
- representatives of local religious and ethnic groups.

Existing disaster plans may include provisions for mass fatalities but should be reviewed and tested regularly, to determine if these plans are appropriate for the relatively long period of increased demand which may occur in a pandemic, as compared to the shorter response period required for most disaster plans. There are currently no plans to recommend mass burials or mass cremations. This would only be considered in the most extreme circumstances.

Since it is expected that most fatal influenza cases will seek medical services prior to death, hospitals, nursing homes and other institutions (including non-traditional sites) must plan for more rapid processing of corpses. These institutions should work with the pandemic planners and the FSAC and coroner office to ensure that they have access to the additional supplies (e.g., body bags) and can expedite the steps, including the completion of required documents, necessary for efficient corpse management during a pandemic.

In order to deal with the increase in fatalities, some municipalities will find it necessary to establish temporary morgues. Plans should be based on the capacity of existing facilities compared to the projected demand, for each municipality. Local planners should make note of all facilities available, including those owned by religious organizations. Some religious groups maintain facilities including small morgues, crematoria and other facilities that are generally operated by volunteers. Access to these resources should be discussed with these groups as part of the planning process during the interpandemic period.

In the event that local funeral directors are unable to handle the increased numbers of corpses and funerals, it will be the responsibility of municipalities to make appropriate arrangements. Individual municipalities should work with local funeral directors to plan for alternate arrangements.

Planning should also include a review of death documentation requirements and regulatory requirements that may affect the timely management of corpses.

1.2 Role of the Funeral Service Association of Canada (FSAC)

It is recommended that all funeral directors contact their Medical Officer of Health to become involved in their disaster and pandemic planning activities with respect to the management of mass fatalities at the local level. The national Mass Fatalities sub-group for pandemic influenza planning has recommended that funeral directors consider it a part of their professional standards to make contingency plans for what would happen if they were incapacitated or overwhelmed. This recommendation is being taken forward to the association, which has an established disaster planning committee. It is expected that this committee will put forward a recommendation to the Provincial/Territorial associations to set up disaster plans.

Currently, FSAC is planning to set up three containers to be placed at three military bases across Canada (probably Edmonton, Toronto area and Halifax). Each container would be a fully organized temporary morgue with all necessary equipment. These are intended for use in such disaster scenarios as major fire, flood or aircraft crash but might be useful as adjuncts to large auxiliary hospitals in a pandemic. FSAC and funerary supplies companies are setting up these containers; any materials used would be re-supplied by the user.

Members of the FSAC board are on the Funeral Supply Coalition Council of Canada. FSAC is likely to take a role in supply (e.g., fluids, body bags and caskets) management for mass fatalities related to a pandemic.

The FSAC is currently updating information regarding health concerns and funeral service issues, which will be available through a publicly accessible web site.

1.3 Autopsies

Many deaths in a pandemic would not require autopsies since autopsies are not indicated for the confirmation of influenza as the cause of death. However, for the purpose of public health surveillance (e.g., confirmation of the first cases at the start of the pandemic), respiratory tract specimens or lung tissue for culture or direct antigen testing could be collected post-mortem. Serological testing is not optimal but could be performed if 8-10 mL of blood can be collected from a subclavian puncture post-mortem Permission will be required from next-of-kin for this purpose.

Any changes to regular practices pertaining to the management of corpses and autopsy requirements during pandemic situations, would require the authorization of the Chief Medical Examiner or Coroner.

If a physician requires that an autopsy be performed, normal protocols will be followed, including permission from the next-of-kin. In cases where the death is reportable to a Medical Examiner or Coroner, the usual protocols prevail based on provincial legislation.

1.4 Preparations for Funeral Homes and Crematoria

In a pandemic, each individual funeral home could expect to have to handle about six months work within a 6- to 8-week period. That may not be a problem in some communities, but funeral homes in larger cities may not be able to cope with the increased demand.

Individual funeral homes should be encouraged to make specific plans during the interpandemic period regarding the need for additional human resources during a pandemic situation. For example, volunteers from local service clubs or churches may be able to take on tasks such as digging graves, under the direction of current staff.

Crematoriums will also need to look at the surge capacity within their facilities. Most crematoriums can handle about one body every four hours and could probably run 24 hours to cope with increased demand. Cremations have fewer resource requirements than burials and, where acceptable, this may be an expedient and efficient way of managing large numbers of corpses during a pandemic.

1.5 Planning for Temporary Morgues

Additional temporary cold storage facilities may be required during a pandemic, for the storage of corpses prior to their transfer to funeral homes. A emporary morgue must be maintained at 4-8° C. However, corpses will begin to decompose in a few days when stored at this temperature. If the body is not going to be cremated, plans to expedite the embalming process should be developed since in the case of a pandemic, bodies may have to be stored for an extended period of time. In jurisdictions where a timely burial is not possible due to frozen ground or lack of facilities, corpses may need to be stored for the duration of the pandemic wave (6 to 8 weeks).

Each municipality should make pre-arrangements for temporary morgues based on local availability and requirements. The resource needs (e.g. body bags) and supply management for temporary morgues should also be addressed. The types of temporary cold storage to be considered may include refrigerated trucks, cold storage lockers or arenas.

Refrigerated trucks can generally hold 25-30 bodies without additional shelving. To increase storage capacity, temporary wooden shelves can be constructed of sufficient strength to hold the bodies. Shelves should be constructed in such a way that allows for safe movement and removal of bodies (i.e., storage of bodies above waist height is not recommended). To reduce any liability for business losses, municipalities should avoid using trucks with markings of a supermarket chain or other companies, as the use of such trucks for the storage of corpses may result in negative implications for business.

Arenas and curling rinks, where the required temperature of 4-8° C can be maintained, are other options for temporary morgues. Using local businesses for the storage of human remains is not recommended and should only be considered as a last resort. The post-pandemic implications of storing human remains at these sites can be very serious, and may result in negative impacts on business with ensuing liabilities.

1.6 Capacity of and Access to Vaults

A vault is a non-insulated storage facility for remains that have already been embalmed, put into caskets and are awaiting burial. In most places in Canada extra corpse storage facilities already exist, as they are often needed from January to April when the ground is frozen and burials are difficult to perform. Although larger cities may be able to open burial plots in winter, smaller communities do not have the equipment or permanent staff to do this.

The accessibility of vaults during the winter should be assessed. A vault may be situated in the back of cemeteries, with entrances that are partially below ground level or in close proximity to headstones, so that a snow blower or plough would have difficulty creating a path of access without damaging some headstones.

In preparation for a pandemic each community should identify the capacity of existing vaults and address access issues for temporary storage. In addition, the need for the creation of new temporary vaults, to meet the increased demand during a pandemic should be addressed. This temporary vault should be non-insulated, have some security features such as covered windows and locks on doors.

2.0 Other Technical Considerations

2.1 Death Registration

Death registration is a provincial/territorial (P/T) responsibility and each P/T has its own laws, regulations, and administrative practices to register a death. Moreover, there is a distinction between the practices of pronouncing and certifying a death. For example, in Ontario physicians, nurses, and in some circumstances police and ambulance attendants may pronounce a person dead. Only physicians, and a small group of designated nurses in narrowly defined circumstances may certify death.

In the pandemic situation, with the increased number of deaths, each jurisdiction must have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be designated to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some central authority (e.g. provincial attorney general, registrar of vital statistics). These special arrangements must be planned in advance of the pandemic and should include consideration of the regional differences in resources, geography, and population.

2.2 Infection Control

The Infection Control and Occupational Health Guidelines (Annex F of the Canadian Influenza Pandemic Plan) provide general recommendations on infection control for health care facilities and non-traditional sites during a pandemic. However, special infection control measures are not required for the handling of persons who died from influenza, as the body is not "contagious" after death. Funeral homes should take special precautions with deaths from influenza. Training in the routine infection control practice and additional precautions is available through the FSAC. <http://www.fsac.ca/>.

Visitations could be a concern in terms of influenza transmission amongst attendees, particularly in smaller communities. For example, in P.E.I., the average attendance at a visitation is 1,000 to 1,400 people; visitations in larger centres are typically a fraction of that size. The Guidelines to Infection Prevention and Control and Occupational Health (Annex F of the Pandemic Plan), lists several recommendations regarding public gatherings. It is the responsibility of the Medical Officers of Health to place restrictions on the type and size of public gatherings if this seems necessary to reduce the spread of disease. This may apply to funerals and religious services. Medical Officers of Health should plan in advance for how such restrictions would be enacted, and enforced, and for consistency and equitability of the application of any bans.

Families requesting cremation of their deceased relative are much less likely to request a visitation, thus reducing the risk of spreading influenza through public gatherings.

2.3 Transportation

No special vehicle or driver licence is needed for transportation of a corpse. Therefore, there are no restrictions on families transporting bodies of family members if they have a death certificate.

Transportation of bodies from their place of death to their place of burial in northern and isolated communities may become an issue, especially if this requires air transport. Local pandemic planners should consult existing plans for these communities and determine what changes can be made to meet the increased demand during a pandemic.

2.4 Supply Management

FSAC is recommending to funeral directors that they not order excessive amounts of supplies such as embalming fluids, body bags, etc., but that they have enough on hand in a rotating inventory to handle the first wave of the pandemic (that is enough for six months of normal operation). Fluids can be stored for years, but body bags and other supplies have a limited shelf life. A supply list for temporary morgues will be accessible through FSAC. Cremations generally require fewer supplies since embalming is not required.

A list of current suppliers is provided in Appendix 1.

Families having multiple deaths are unlikely to be able to afford multiple higher-end products or arrangements. Funeral homes could quickly run out of lower-cost items (e.g. inexpensive caskets such as cloth and some wooden caskets) and should be prepared to provide alternatives.

3.0 Social/Religious Considerations

3.1 Special Populations

A number of religious and ethnic groups have specific directives about how bodies are managed after death, and such needs must be considered as a part of pandemic planning. First Nations, Inuit, Jews, Hindus, Muslims, all have specific directives for the treatment of bodies and for funerals. The wishes of the family will provide guidance, however, if no family is available local religious or ethnic communities can be contacted for information. For example, in the case of First Nations peoples, mechanisms currently exist to communicate with band councils for this purpose (established to deal with archeological issues) and medical examiners should contact the band council of the individual where this is possible.

As a result of these special requirements, some religious groups maintain facilities such as small morgues, crematoria, and other facilities, which are generally operated by volunteers. Religious groups should be contacted to ensure these facilities and volunteers are prepared to deal with pandemic issues.

Religious leaders should be involved in planning for funeral management, bereavement counselling, and communications, particularly in ethnic communities with large numbers of people who do not speak the official languages.

3.2 Northern and Isolated Communities

Northern and isolated communities face particular issues in dealing with large numbers of fatalities. The following issues make the preparation, storage and burial/disposal of large numbers of corpses very challenging in such communities.

- The lack of funeral service personnel and other resources.
- The extreme cold weather and heavy snowfalls in winter result in difficulties with burials, and in difficulties with the transportation of corpses.
- In remote areas where families live vast distances apart, corpses may have to be transported a long way for burial/disposal. This may be challenging for areas with few plane flights and no road access or poor road surface conditions. The large distances also pose a challenge for the transportation of funeral directors and funeral supplies.
- Permafrost, boggy land and other geographical features also pose a challenge to transportation and burial.

Planners responsible for these jurisdictions should ensure that local pandemic plans address these issues.

Appendix 1: List of Current Suppliers

Embalming fluids and suppliers:

- H.S. Eckels and Company, Guelph, Ontario
- Esco of Rexdale, Ontario
- Les Fournitures, J.C.R. Inc., Vanier, Québec
- Dodge Chemical, Mississauga, Ontario

Casket suppliers:

- Alton Caskets
- J.I. Astley & Associates
- Batesville Canada
- Bernier Caskets Inc./Cercueils Bernier Inc.
- Classic Casket Distributors, Limited.
- Colonial Caskets Limited
- Cercueils Concept Inc/Concept Caskets Inc.
- Cormier & Gaudet
- Exquisite Enterprises, Inc.
- Imperial Evergreen Casket Corporation
- Imperial Casket (Calgary) Limited
- Imperial Casket (Saskatchewan) Limited
- Imperial Casket (Manitoba) Limited
- Imperial Legacy Caskets Limited
- Industries Maximel Inc.
- Cercueils Magog Caskets
- Northern Casket (1976) Limited
- Cercueils South Durham Caskets
- St. Lawrence Casket Co. Inc.
- Trans-Global Casket
- Victoriaville Funeral Supplies, Inc.
- Winkler Caskets Co. Limited

J Guidelines for Non-Traditional Sites and Workers

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Introduction

In influenza pandemics over 50% of persons may be infected and the majority of illnesses and deaths will tend to occur over a period of six to eight weeks in any one location. Epidemiologic data from influenza epidemics and past pandemics show that 15% to 35% of the population could become clinically ill. Consequently, even a low frequency of complications result in marked increases in rates of hospitalizations. An estimate of the health and economic impact of a pandemic in Canada has been performed using a model developed by Meltzer and colleagues, CDC, Atlanta (<http://www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm>). Based on this model it is estimated that between 2.1 and 5.0 million people would require outpatient care, between 34 thousand and 138 thousand people would require hospitalization and between 11 thousand and 58 thousand people would die in Canada during an influenza pandemic.

Due to the large number of patients who would require medical services during an influenza pandemic, communities and health care organizations must have guidelines in place that will address what will be done if health care organizations are overwhelmed. The use of non-traditional sites (NT sites) for the provision of medical care and the need for additional human resources, including volunteers and other health care or non-health care workers, must be considered as a strong possibility and planned for accordingly. Legislative, management and professional authorities will have to be clearly defined at the local level.

This document is divided into two main sections. The first section provides guidelines regarding the utilization and administration of NT sites, and the preparedness and operational activities that should take place with respect to NT sites during the interpandemic, pandemic and post-pandemic periods. The second section focuses on the need for and identification of additional human resources as part of pandemic planning, and also identifies activities by each pandemic period.

1.1 Definition of a Non-Traditional Site

The following is a definition of a non-traditional site (NT site) for the purposes of planning for an influenza pandemic.

A non-traditional site is a site that is:

a) currently not an established health care site, or
b) is an established health care site that usually offers a different type or level of care.

The functions of a non-traditional site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic.

1.2 Potential Roles of Non-Traditional Sites

The role of any NT site will depend on the needs of the community and the resources available. It is expected that NT sites will be used during a pandemic for three main purposes:

- the care of patients who are not critically ill when hospitals are overloaded,
- as domiciliary care for individuals unable to care for themselves at home, and
- as a "step-down" unit for the care of stable patients that have been transferred from acute care hospitals.

Where possible care at non-traditional sites should be limited to supportive care or palliation for influenza patients. Critical care would likely not be possible within these sites and should remain in the acute care setting. Persons with immunosuppressive illness or communicable diseases other than influenza (e.g. tuberculosis) should not be admitted to these sites.

In communities with a high proportion of elderly or high risk persons, the role of the NT site may need to be expanded to include the provision of health care services specifically related to dealing with the exacerbation of co-morbidities (e.g. chronic heart or lung disease, diabetes) in these groups.

Depending on the impact of the pandemic and the health care resources available in the community, NT sites may serve several functions. They may be set-up as triage centres, mobile health units, acute care or sub-acute care providers, clinics, or emergency residential facilities for those that cannot care for themselves at home or for cases that usually live with a high-risk individual.

1.3 Administrative Options for Non-Traditional Sites

NT sites may be established as a "satellite site" of an acute care facility or other health care facility, or as a "free-standing site". The "satellite site" model is advantageous since it does not require establishment of a separate administrative structure. Specifically, linkage with an existing acute care facility or other health care facility would facilitate the following:

- prompt implementation of an administrative structure,
- ordering, tracking and maintenance of equipment and supplies,
- implementation of record keeping and patient tracking systems,
- implementation/establishment of nursing protocols and patient care guidelines,
- sharing of expertise and human resources between sites,
- access to services such as sterilization, laboratory services, pharmacy services, laundry, food services,
- referrals between the site and the affiliated health care facility, and
- extension of liability, workers compensation and other insurance programs to the satellite site.

The satellite site is the recommended administrative option, however, where it is not possible to set-up a "satellite site" the establishment of "free-standing sites" will be necessary. Planning for the administration of "free-standing sites", including how the issues listed above will be dealt with at the site, will need to be completed during the inter-pandemic period. It is recommended that pandemic planning be incorporated into the existing emergency response plan.

Triage, transfer and transport agreements between the NT site and the affiliated health care facility or referral hospital need to be established.

Regardless of the administrative structure of the site, an individual or team needs to be designated to oversee the care provided in each NT site. This person/team should monitor patient flow, maintain a log of patient activity including patient outcome, and monitor availability of supplies. Delegation of these responsibilities to ensure ongoing and consistent administration of the site needs to be planned for in advance.

1.4 Insurance Issues

In planning for the establishment of NT sites during a pandemic it is important that insurance needs are considered and that provisions for appropriate insurance are made. Do not assume that the insurance covering the site for its usual use will extend to cover its use as an emergency medical site. Specifically, fire/damage/theft insurance and site liability insurance will be required for NT sites.

1.5 National Emergency Stockpile System

The National Emergency Stockpile System (NESS) was primarily developed for use in crises such as natural disasters, earthquakes, or other emergencies in which there is a sudden need for supplies and equipment to deal with a large number of people with varying medical needs. The program involves the purchase, packaging, shipping and storing of supplies and equipment organized into "kits" designed to meet specific emergency medical needs. The components of the "kits" are packaged and stored in warehouses across Canada to facilitate timely distribution. The NESS should not be confused with provincial emergency stockpiles that may exist within each province or territory.

In the event of a pandemic, specific kits or units from the stockpile could potentially be used to facilitate reception, intake, triage and provision of medical and social services at a NT site. The following is a brief description of the types of kits/units available through the NESS.

Emergency Hospital - capable of providing support to the existing health care system by the provision of acute and short term medical care for up to 200 patients. Also has the adaptability to support social services functions (i.e., evacuation centres, reception areas, shelters, etc).

Advanced Treatment Centre - capable of providing early medical and limited surgical procedures in a 'field' or operational environment; also used to support the movement of patients to other health care facilities. Can also support the movement of evacuees and the operations of shelters, evacuation centres, reception areas, etc.

Casualty Collecting Unit - capable of providing immediate first aid care and movement of patients to other health care facilities. Also can support the movement of evacuees and the operations of evacuation centres, shelters, reception areas, etc.

Reception Centre Kit - provides supplies, and registration and inquiry materials for the set-up and operation of reception functions for evacuation centres/shelters.

Mobile Feeding Unit - provides an emergency feeding capability in a 'field' environment, or where normal food services are not available (equipment and supplies, not food).

Trauma Kit - consists of first aid, intubation equipment, IV solutions and medical components to support first line response, patient triage and stabilization. Is useful in a patient staging facility (mini clinics, advanced treatment centres, etc).

Mini Clinic - intended to supplement existing medical care facilities in a disaster situation that overwhelms their system (e.g. a hospital emergency room). It would be located adjacent to these facilities to triage and treat the less seriously injured, so that the main facility remains clear to accept and treat the seriously injured.

The equipment supplied is older but well maintained. New equipment is being added to certain units and others are being reconfigured to be more effective. Transportation of these materials is dependent upon commercial or military vehicles and requires access by road or, for some items, an airport that will accept a Hercules aircraft.

In the event of a local emergency that overwhelms available municipal resources, the protocol for accessing the NESS program is that the municipality contacts the provincial/territorial emergency management authorities. Release of equipment or supplies must then be coordinated through the Provincial/Territorial Health, or Social Services Director. In certain cases the distribution of drugs is handled directly by provincial Chief Medical Officers of Health.

The NESS equipment and supplies are owned by the Office of Emergency Services, Health Canada and are made available to the provinces/territories on a loan basis. The Province/Territory administers this Federal program under guidelines established by the Office of Emergency Services and through 'Memoranda of Agreement' between the Minister of Health, Health Canada and the Provincial/Territorial Health and Social Services Minister(s). In a national emergency or large-scale disaster, the authority for the release and use of the stockpile equipment remains with the Director of Emergency Services, Health Canada. To obtain an Emergency Hospital or other unit, a Provincial Emergency Services Director must apply to the Director, Centre for Emergency Preparedness and Response, Health Canada.

For more information on the National Emergency Stockpile System contact your provincial/territorial Emergency Services Directors

1.6 NT Site Planning During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below the list.

- Review emergency preparedness legislation
- Identify triggers for implementation
- Plan for the triage process
- Assess locations for potential NT sites
- Planning for critical equipment and supplies

1.6.1 Review Emergency Preparedness Legislation

Emergency preparedness legislation makes many provisions for management of a crisis including: obtaining and accessing materials and other resources, implementation of crisis plans and a crisis management structure. Pandemic planning should be integrated with the emergency plans of the jurisdictions in order to make best use of existing plans and resources.

Important note: Regional pandemic plans should not assume that a national or provincial emergency will be "declared", as this is unlikely to occur during a pandemic. Provincial and Territorial planners should assess issues such as workers compensation and liability insurance, maintaining and supporting workers and other aspects of the plan without, such a declaration.

The national support framework is not contingent upon declaration of a national emergency. The resource management and non-traditional sites working groups recommend all provincial and territorial planners review both federal and provincial/territorial emergency legislation to determine how to integrate plans within the framework of emergency legislation.

For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- the ability and responsibility of authorities to requisition property for use as NT sites,
- access to transportation, materials, administrative staff and other resources, and
- compensation for requisitioned property.

1.6.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Canadian Pandemic Influenza Plan and the pandemic phases will also describe general points of action.

In co-ordination with existing legislation and plans, provincial/territorial, regional and local authorities and institutions should identify key criteria and methodologies that would trigger the phased implementation of plans regarding NT sites in their jurisdiction. Local authorities, most likely the local medical officer of health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction, including recommendations regarding the establishment of NT sites.

Since it is likely that the pandemic will not start in Canada, the first trigger for the consideration of establishment of NT sites may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Canada in terms of demand on traditional health care services.

In each locality it will be important for the local pandemic response team to be monitoring the availability of resources in their local acute care facilities and projections regarding when capacity may be exceeded (especially if there will be "free-standing sites"). Therefore potential triggers include:

- The proportion of emergency room visits attributable to influenza.
- The proportion of influenza cases requiring hospitalisation.
- The capacity of the hospital to accommodate influenza cases.
- The proportion of cases who normally live with high-risk individuals or who have no support at home and cannot care for themselves.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for further implementation of plans for NT sites. These triggers should be established during the interpandemic period.

1.6.3 Plan for the Triage Process

***Definition of Triage*:**

> A process whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors.

In order to reduce demand on hospital emergency departments and potentially on family physicians and walk-in clinics, it may be necessary to perform triage at NT sites during the pandemic. The use of such a system will require a significant public awareness campaign since ill people will tend to seek services at their usual health care providers.

The Clinical Care Guidelines and Tools (Annex G in the Canadian Influenza Pandemic Plan) provide recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or co-morbidities. The guidelines on initial assessment and management assist healthcare staff, as well as volunteers with minimal expertise, to rapidly evaluate the needs of each individual and to sort patients efficiently in a crisis situation (i.e., to decide when patients can be treated as outpatients, or if they need to be redirected or admitted to a hospital). In larger communities, patients who required further assessment by a physician, X-rays and laboratory tests (secondary assessment) would likely be transferred to an acute care facility. Some NT triage centres, however, may have the facilities to perform secondary assessment and treatment without moving the patients.

Designation of NT sites as triage centres specifically for influenza-like-illness has the added advantage of potentially reducing the exposure of other patients to influenza, consistent application of current recommendations through the use of patient care protocols and control over the number and type of other services, such as laboratory testing and chest x-rays, that are being ordered.

Non-traditional triage sites may be established at public health clinics/units, specifically identified walk-in clinics or triage centres adjacent to or associated with acute care institutions.

Triage sites will need to be organized to provide streamlined and efficient service. The following table is provided for planning purposes and suggest how a site might be organized.

Zone	Service	Training Required
Registration Zone	Register in-coming patients	Trained non-medical workers
Waiting Zone	Awaiting Primary Assessment	Medical professionals with trained non-medical workers
Primary Assessment Zone	Vital signs Chest auscultation & assessment	Trained non-medical Medical Professional (Physician or Nurse)
Secondary Assessment Zone	On-Site Lab Tests Secondary assessment	Trained non-medical workers Physician
Advanced First Aid & Transfer Zone	Service to patients who arrive in distress includes oxygen, suction, etc. while they await transfer to emergency department	Advanced First Aid
Education Zone	Education resources and advice	Trained non-medical workers
Discharge Zone	Follow up or transfer	

The Infection Control and Occupational Health Guidelines (Annex F in the Plan) lists some guidelines for the set up of triage and preliminary treatment sites including:

› If possible, separate those with influenza like illness (ILI) and those without ILI by: minimizing time spent in waiting rooms; providing separate entrance/waiting areas for patients with ILI; placing patients with ILI directly into a single room; separate patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least one metre.

› Remove magazines and toys from the waiting rooms.

› Clean equipment and environmental surfaces in examination/treatment rooms potentially contaminated by coughing patients as frequently as possible, preferably after each patient.

1.6.4 Assess Locations for Potential NT Sites

It is recommended that a multidisciplinary team approach be used to assess potential NT sites in a jurisdiction, to ensure suitability of a potential site. Ideally the assessment team should include:

- emergency personnel/police/fire,
- health care personnel, and,
- engineering/maintenance/public works staff.

This team should conduct a community-wide space and site inventory to determine the location and availability of potential sites for NT hospitals and vacant land for possible mobile hospital installations. This assessment should be repeated at regular intervals during the interpandemic period to ensure that identified sites remain suitable. Potential locations for NT sites include, but are not limited to:

- schools
- hotels
- community halls
- banquet facilities
- arenas
- churches
- closed hospitals or hospital wards
- day care centres

For each location the feasibility of its use as a NT site should be determined based on the information below and the intended use of the facility.

Since a site at which inpatient care will be provided will have the most stringent and demanding requirements, it might be reasonable to assess each location for this type of service provision. Locations that are not found to be suitable for provision of inpatient care may be considered for another purpose such as triage or provision of education/counselling services.

Characteristics and Services Required for an Inpatient Care Setting

Each building under consideration should meet the National Building Code standards for its currently designated building type.

Once the building code standards have been assessed, the following issues need to be considered:

- Adequacy of external facilities:
  - public accessibility (including public transport, parking, directions) off-loading, traffic control, assistants for elderly, etc.
- Adequacy of internal space:
  - washrooms and sinks: number m/f; amenities, function
  - kitchen: refrigeration, dishes, dishwashing capability, food preparation areas etc.
  - secure space for administration/patient records

    - space for reception, waiting, patient care, patient/family education, counselling/support, and any other services defined by the planning process
    - secure storage capacity for pharmacy and other supplies
    - mortuary space
- Adequacy of critical support systems required for the site to provide patient care:
    - ventilation system (adequate air flow, air conditioning)
    - physical plant/ building engineering
    - electricity - power for lighting, sterilizers, refrigeration, food services.
    - natural gas supply – e.g., for heating or electricity or cooking
    - water supply
    - sanitation (including number of toilets, showers or washing facilities)
- Arrangements to provide essential support services required for the provision of in-patient care:
    - security
    - communications capability
    - maintenance
    - laundry
    - environmental/cleaning services
    - sterilization services – Sterilization of equipment should be provided by trained and experienced personnel using certified equipment. Appropriate arrangements for sterilization services, e.g., with a hospital, may be required
    - pharmaceutical services
    - medical waste disposal/storage
    - mortuary/funeral services
    - food services
    - facilities for staff lodging and feeding

Infection Control

When planning for a NT site it is important to establish whether the site will focus only on the care of influenza patients or whether other types of patients will be receiving services at these sites. Infection control issues will be greater if transmission of influenza to other patients is a possibility.

All patient beds should be separated by at least one metre; as is the norm for patients with any medical condition. If non-influenza patients will be seen at these sites separate waiting areas should be considered for potential influenza patients. For NT sites focussed on influenza, there appears to be no infection control basis for segregating people at various stages of illness. In either situation health care workers and visitors to the site will need to be educated regarding appropriate infection control practices.

Infection prevention and control issues are addressed in detail in Annex F of the Plan.

Security and Safety

The safety of buildings will be based on National Building Code and CSA standards. "Security" includes security of access, security of medications, and the security of patients. Security issues must be considered in choosing sites as well as when planning for staffing needs.

Upgrade Facilities

Some facilities may need to be upgraded, in order to be used as a medical site. Local authorities may wish to upgrade designated facilities in order to ensure they are adequate. Upgrades such as improving power supplies and upgrading washing facilities may be considered as an investment in emergency preparedness and part of overall emergency planning for the community.

As it is much less expensive to build in facilities at the time of construction then to add them later, emergency planners and pandemic co-coordinators may work with local authorities, school boards, etc. to add facilities to buildings that are under construction. .

1.6.5 Planning for Critical Equipment and Supplies

During the interpandemic period planners should identify critical equipment and supplies necessary for the establishment and operation of NT sites. Sources of supplies need to be identified; expected needs during an influenza pandemic and ability to meet those needs should be discussed with all possible suppliers. Potential access to the NESS should also be addressed.

A pandemic will likely result in shortages of medications, medical supplies and potentially operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting Canadian supplies will be:

> *Interrupted transportation lines* — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.
>
> *Lack of inventory* — In an effort to reduce costs, most health regions have moved to "just-in-time" inventory systems that keep minimal supplies on hand. Consideration should be given to the purchase of products made in Canada to avoid potential supply problems due to border crossing restrictions implemented at the time of the pandemic.
>
> *Embargoes* — The majority of medical supplies are not produced in Canada. Health Canada has made major efforts to establish a domestic infrastructure for the manufacturing of influenza vaccine and has encouraged in-Canada manufacture of some antibiotics. However in many cases supplies are provided by only one or two manufacturers worldwide or the essential ingredients or components come from a single source. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies.

Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other annexes.

Transportation and Supply Logistics

Transportation planning for NT sites should include consideration of the types of supplies and products (e.g., dangerous goods such as oxygen, biomedical waste, equipment for sterilization) that will need to be transported to and from NT sites, who will provide these services (i.e., will volunteers need to be trained) and whether the site has appropriate delivery access. The size and types of vehicles and other mechanisms of transport have been identified for each "kit" that is available through the NESS.

Stockpiling

Provinces/territories and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for NT sites within their own jurisdictions. Jurisdictions may specifically wish to keep some older equipment such beds, which need little maintenance and have no specific "shelf life". Appropriate assessment should be made of the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc.

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators.

The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be address at the P/T and local levels. In addition, provinces and territories will have to discuss with local pandemic planners the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g. chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. The Clinical Care Guidelines (Annex G) provide guidance on antibiotics for the treatment of secondary pneumonia. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

Equipment and Supplies

The issue of equipment and supplies has been addressed in other annexes. The Resource Management annex provides information on supplies and equipment issues for acute care facilities that can be extrapolated to identify needs for NT sites. In addition, the treatment protocols in the Clinical Care Guidelines (Annex G) can be used to plan for medical supply and equipment needs. The Infection Control annex will address the use of masks and gowns and other supplies in various settings.

The services offered by each NT site will obviously dictate equipment and supply needs. For example, it is unlikely that NT Sites will be able to provide the expertise and resources required to support intubated patients, however, equipment may be needed to support patients requiring ventilation while they are transported to another facility. Isolated communities may wish to review the possibilities for hand ventilators (Ambubags) for short-term assistance and other equipment that does not require the same expertise or support as for ventilated patients.

The following is a preliminary list of medical equipment and supplies needed to provide medical care in each site.

- beds, bedding
- lights

- intravenous equipment (e.g., needles, intravenous catheters, fluid and tubing, syringes, tape, tourniquet)
- sterilizers
- sphygmomanometer, stethoscopes, thermometers
- miscellaneous supplies (e.g., antiseptics, dressings, bandages, steristrips, gloves, alcohol based hand sanitizers, alcohol sponges, gauze sponges, arm boards, pulse oximeter, extra batteries for equipment needs, flashlights, scissors, tongue blades, portable lamps)
- emergency drugs (e.g., epinephrine, diazepam, salbutamol)
- airway supplies (e.g., bag-valve-mask, oxygen masks, oxygen tubing, oxygen tank, spacer device for aerosolized medication, motor-driven nebulizers, oral airways, suction machines and catheters)
- patient identification tools
- privacy screens
- communications (telephone, fax, cell, radio or alternatives for isolated communities)
- computers and Internet access

Supplies will need to be carefully managed. An example of a supply management form is provided in Appendix A.

Local Production

During a crisis some items, which are usually ordered from centralized sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

1.7 NT Site Planning During the Pandemic Period

The following activities, with respect to NT sites, should occur during the pandemic, when there are indications that NT sites will be needed, based on local resource availability and utilization, and projections of disease impact:

- Re-evaluate plans based on WHO and Health Canada epidemiological projections.
- Appoint site administrators/managers or teams
- Implement plans to prepare the site(s)
- Co-ordinate procurement of supplies

1.7.1 Re-evaluate Plans Based on WHO and Health Canada Epidemiological Projections

Based on expected attack rates and the demographic of the groups most affected, local planners may re-evaluate what sites and services may be required. For example, if it appears pregnant women will be seriously affected by influenza as they were in 1918, moving deliveries to birthing centres may not be appropriate.

1.7.2 Appoint Site Administrators/Managers or Teams

Each NT site will require a site administrator/manager or a team of managers to locate the site, set up, manage adaptations, schedule staff, oversee movement of supplies, maintenance etc. and continue to operate the site. Depending on the size of the NT site, what services are offered and the community, this may require on-site management 24 hours a day 7 days a week for the duration of the epidemic wave. The nature of the task and the fact that any one may fall ill or be incapacitated requires that all such managers should have alternative people to whom to delegate authority.

1.7.3 Implement Plans to Prepare the Site(s)

The Centre for Emergency Response and Preparedness (CEPR), Health Canada, has developed outlines for the planning and operation of Emergency Reception Centres and Shelters available through CEPR or the Provincial/Territorial Emergency Services Directors.

- Contact those currently responsible for the site (school board, civic authorities for community centres, etc.)
- Conduct a "walk through" of the site to determine any problems or needed emergency upgrades.
- Ensure heat/light/power/water/telephone is operational.
- Ensure adequate furniture and position.
- Remove any obstructions, tripping hazards, impediments to flow, etc.
- Affix or erect any necessary directional signs, including route to washrooms if unclear.
- Identify various rooms/areas for specific functions (e.g., rest, food service, etc.)
- Ensure adequate hand hygiene stations are available.
- Document and report any:
    - deficiencies in facilities;
    - failure of heat/light/power/water/telephones.
- Arrange to move out and store any equipment that will not be needed (e.g. desks, chairs).
- Clean and disinfect the site.
- Contact any required transportation providers.
- Notify pre-determined media for public direction.
- Determine staff support - electrician/plumber/public health inspector/public health nurse/Occupational Health and Safety personnel.
- Determine municipal support.
- Address financial implications to municipality. Ideally, using previously established accounts.
- Notify garbage removal contractor if required.
- Notify recycling removal contractor if size or duration indicates.
- Notify staff, volunteer agencies, and specialty personnel (see Human Resource Section).

1.7.4 Coordinate Procurement of Supplies

- Contact stationery, office, and support equipment providers; arrange transportation if required.
- Contact identified food suppliers (may be a pre-alert to provide lead time).
- Notify any required food transporters (vehicles).
- Arrange for dishes/eating utensils if not present at identified food serving locations.
- Order additional medical supplies.
- Establish alternate transportation/distribution arrangements if required.
- Establish local production of supplies where possible.
- Evaluate the need to access supplies from the NESS and request if necessary.

1.8 NT Site Planning During the Post-Pandemic Period

The possibility of subsequent waves of the pandemic, and the resources that would be required during those waves, should be considered before decommissioning NT sites.

Activities at NT sites during the post-pandemic period will focus on the discharging or re-locating of patients, storage of medical records and the decommissioning of the NT site(s). Each site should be assessed for damage or necessary alterations to return it to its previous use. Supplies should be redistributed, stored or returned to stockpiles. Insurers will also need to be notified of the date the site was decommissioned in order to discontinue the coverage.

2.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings, including NT sites or to different locations within the same traditional site to provide services that differ from their usual responsibilities. In addition, non-health care workers may need to be hired/contracted to provide supplementary services essential to the establishment and operation of NT sites or the expanded role of current health care sites. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and NT sites must be established or current service sites expanded. Human resource management in the acute care setting during a pandemic is addressed in the Resource Management Guidelines for Health Care Facilities During an Influenza Pandemic, Annex H of the Plan. This section of the document will, therefore, focus on human resource issues outside of the traditional acute care settings.

2.2 Human Resource Planning During the Interpandemic Period

Planning during the interpandemic period for the optimal use of human resources at NT sites and other health care sites involves several steps. The following list of steps/activities is provided to assist with this part of the planning process, details are provided in the following sections.

- Appoint a human resource management team.
- Identification of human resource needs and a database to be used for staff and scheduling.
- Review emergency preparedness legislation.
- Recruitment of health care professionals.
- Plan for salaries or payments to staff not currently employed by the health care system.
- Identify and recruit volunteers.
- Provide training.
- Establish immunization recommendations.
- Supporting health care workers in NT sites.
- Insurance/licensing.

2.2.1 Appoint a Human Resource Management Team

The work involved in identifying current health care workers who could be re-located to NT sites; recruiting additional health care workers, non-medical workers and volunteers; and managing the training, assignment and support of these workers, should be initiated during the interpandemic period.

Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, and volunteer organizations would be desirable for this planning team/subcommittee.

2.2.2 Identify Human Resource Needs

One approach to identifying the human resource needs for NT and other health care sites is to consider each potential type of site and the services that would be provided at each. From this exercise the number and type of health care workers and non-health care workers that would be required per site could be estimated.

The following is a list of where additional or new human resources will be needed during a pandemic (excluding acute care facilities).

- Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital
- Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.
- Vaccination Clinics – mobile clinics, clinics in acute care sites, etc.
- Home Care/Community Care – to reduce the pressure on other health care programs
- Long Term Care Facilities
- Telephone Information Services, 24-hour health lines
- Other – doctors' offices, specialty health services (cancer or cardiac treatment centres), etc.

In order to make best use of the skills of various health care workers a pandemic will likely require that health care workers be reallocated from their usual roles and settings. For example, trained, health care professionals, will be required to supervise volunteers and other staff in clinics and non-traditional sites.

Shortages of physicians and nurses will require extensive use of other health care professionals, trained non-medical workers and trained volunteers. Each jurisdictions needs to conduct an inventory of health care personnel and potential volunteers and determine sources from which additional staff could be acquired, assuming that hospitals are using much, if not all, available staff for their own needs. The following list is for reference, and may be adapted and altered to meet various needs.

Health Care Workers (HCW)

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

- retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)
- physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)
- medical and nursing students
- registered nursing assistants
- patient care assistants
- emergency medical technicians
- veterinarians
- pharmacists
- therapists (respiratory/occupational/physio)
- technicians (laboratory, radiography)
- pharmacists, therapists, technicians in training
- health care aides

Personal Care Services

Personal care services involve those people that provide health care and support services in the home. It is recognized that these organizations already function near capacity and may have limited ability to expand during a pandemic. These services include, but are not limited to:

- VON
- Home Health Agencies

Categories of Workers

In a pandemic, in addition to current health care workers, health care tasks may have to be undertaken by personnel who would not normally perform these tasks. For the purposes of assigning tasks, training, support, insurance and other issues human resource planners and managers must be aware of the following types of workers:

- Paid health care professionals
- Paid health care workers who are not licensed professionals
- Paid non-health care/non-medical staff (support, maintenance, etc.)
- Volunteer health care professionals
- Volunteers trained in medical tasks, but who are not licensed professionals.
- Volunteers not trained in medical tasks, but can provide other essential services to health care sites– e.g. electricians, who help set up the NT site.

For each site the essential functions and the skills required to complete each task should be identified and documented. It will be necessary to establish medical and nursing directives for each NT site (triage, influenza hospital, nursing station, community clinic or support hotel) and to access existing directives for sites that may need to be expanded during a pandemic.

The next step is to list the type of workers/volunteers who already have the skills to carry out these tasks. (In existing institutions these roles are already defined, however they will need to be developed and adapted for use in the Non-Traditional Sites.) Any gaps in required skill sets should be addressed during this planning exercise. It may be necessary to investigate the local availability and access to other types of service providers in this type of emergency situation (e.g., mortuary services).

Checklist of Functions and Personnel at Non-Traditional Sites

This is a checklist of functions that may be required at a non-traditional site. It is an example of how the exercise described above might be documented. Depending on size, number of patients and function of the site, many tasks may be carried out by the same individual. Consider that these functions may be required 24 /7. Some services may be provided by a central hospital or community.

	FUNCTIONS	SKILL SETS/PERSONNEL
A	**Administration**	
	Site Administration/Management	Management/administration
	Co-ordination of Patient Care – staff scheduling and support, assessing service demands and supply	Medical training/knowledge (e.g. in-charge nurse), leadership and coordination skills
	Medical Management	Physician or nurse with physician backup
	On-site training and orientation of staff, volunteer and family members	Knowledge of basic patient care, patient triage, infection control, occupational health and safety
	Spokesperson	Medical management. If no medical spokesperson refer to hospital or site administrator
	Receptionist	Communication/language skills, public relations
	Health Records Management	Clerical skills (including computer skills), confidentiality agreement
	Information Technology Resource	Knowledge of IT systems and problem solving skills

	FUNCTIONS	SKILL SETS/PERSONNEL
B	Patient Care	
	Medical triage	Medical training/nurse, ideally with ER training
	Admissions/Discharge	Medical training/nurse, ideally with experience in discharge planning
	Patient Care - medical	Instructed in nursing care: rehydration, feeding, ambulation, bathing, vital signs monitor, give meds
	Physiotherapy	Trained in chest phyiotherapy and mobilization
	Respiratory care	Trained in oxygen delivery, patient monitoring, equipment monitoring (oximeters) and inventory
	Pharmacy Services	Pharmacist at hospital or in community
	Discharge planning	(Refer to community care, self care)
C	**Infection Control**	
	Sterilization of Equipment	Trained in sterilization and infection control
	Housekeeping	Basic infection control knowledge
D	**Food Services**	**Hospital or community based?**
	Patient nutrition/therapeutic diets	Dietician at hospital or in community (home care, meals on wheels)
	Food preparation - workers' meals	Basic food safety training
E	**Social Services**	
	Social service/community care	Counselling, accessing community resources/Liaison Social Worker
	Psychology/Pastoral Care/Grief Counselling	Social workers, religious leaders, psychologists, local service clubs/support groups
	Care for children/family members of workers	Training or experience in child care, care for elderly, home care/criminal records check

	FUNCTIONS	SKILL SETS/PERSONNEL
F	Morgue	
	Transportation of corpses	Driver's license
	Preparation and storage of corpses (see Annex on Mass Fatalities)	Body bagging, shelving corpses
G	Transportation	
	Patients, Staff	Class 4 license
	Dangerous goods (e.g. oxygen), medical waste	Appropriate licenses and liability insurance
	Supplies, Lab tests	Drivers license, criminal records check
H	Services	
	Laboratory testing	Laboratory services at hospital or in community
	Maintenance	plumbing, electrical, etc.
	Laundry	local laundry business
	Communication services and equipment support - phone, cells, cable, computer support	Local businesses
I	**Security (Staff ID will be necessary)**	
	Public order and personal safety	Crowd control, traffic control
	Protection of site – fire safety, theft	Trained in building safety and security

Training for health care workers, volunteers, family members may be carried out at the time of a pandemic.

2.2.3 Review Emergency Legislation

Emergency legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. Remember, it is unlikely that an Emergency will be "declared". Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;

- safety and protection of workers, (one of the primary responsibilities);
- fair compensation;
- insurance, both site insurance, workers compensation and other forms of insurance;
- training;
- provision of clothing and equipment;
- protection of the jobs of workers who take leave to assist during the crisis.

Compelling Workers

Under emergency legislation Provinces/Territories may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort*.

This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the extreme difficulty of enacting or enforcing such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining essential human resources, in advance of a pandemic.

2.2.4 Recruitment of Health Care Professionals

While actual recruitment of health care professionals for the purpose of service provision will not be necessary until the pandemic arrives, it is important to establish an ongoing dialogue with these professionals in the interpandemic period. Communication must take place to inform health care professionals about influenza, influenza pandemic plans and their roles within those plans. It will be important to convey the potential impact of the pandemic on health care service provision and specifically the need for additional human resource and NT sites. Issues regarding licensing and scope of practice expansion during a crisis should be discussed with the goal of addressing any concerns during the interpandemic period rather that at the time of the pandemic. In addition, any potential impediments for recruited/volunteer health worker being able to return to their own workplace following the provision of services in the NT site, will need to be addressed in advance. Education regarding the identification and treatment of influenza and immunization programs should also be ongoing during the interpandemic period.

In order to be able to call on health care professionals, for the purpose of pandemic training or the implementation of the pandemic response, planners should review the logistical and legal issues around developing databases of HCWs who have the training and skills needed during a pandemic. This may be achieved by arranging with the appropriate licensing bodies or associations for the establishment and maintenance of databases of members for use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of professionals available for work in a crisis.

2.2.5 Plan for Salaries or Payments to Staff Not Currently Employed by the Health Care System

Decisions around payment and expenditures will be based on current arrangements and labour agreements in each province, territory or local jurisdictions. Planning must be based on these contractual arrangements or assessment of current local salaries for similar work.

2.2.6 Identify and Recruit Volunteers

Definition of Pandemic Volunteer

The following is a definition of a volunteer for the purposes of pandemic planning and response.

> ***A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support Canada to prepare for and respond to an influenza pandemic. A volunteer is one who offers his/her service of his/her own free will, without promise of financial gain, and without economic or political pressure or coercion.***

A volunteer may be a health care or other professional, or any other person who offers their services freely. Notwithstanding that while a volunteer may not expect financial gain, or remuneration for their time, the agency or government may provide supports such as: insurance protection, family support and job security to facilitate the recruitment of needed volunteers.

Interpandemic Tasks in Volunteer Management

There are several tasks/activities that should take place during the interpandemic period to optimise the use of volunteers in the pandemic response. These include:

a. Communicate with the public and with volunteer organizations.
b. Develop and maintain databases of volunteer organizations.
c. Develop Job descriptions and skill lists for volunteer positions in conjunction with volunteer agencies. (See Checklist of Functions and Personnel)
d. Develop recruitment, screening procedures.
e. Develop training procedures.
f. Monitor and track qualifications.
g. Prepare to manage volunteers.

The time between the WHO declaration of an influenza pandemic, the first wave and analysis of the severity of the pandemic will be very short. There will be a need to recruit, screen, train and deploy volunteers as quickly as possible. Therefore procedures need to be in place in order to best place volunteers in as short a time as possible.

a. **Communicate with volunteer agencies**

Existing volunteer agencies will be the primary source of trained, screened volunteers in most jurisdictions. Developing ongoing communications and planning procedures with these agencies will be essential to the planning effort.

Potential sources of volunteers include, but are not limited to:

- Red Cross
- St. John Ambulance
- Salvation Army
- Volunteer Fire Departments
- Mennonite Disaster Services
- Adventist Disaster Relief Association (ADRA)
- Scouts, Sea/Army/Air Cadets, Guides
- Big Brothers
- Big Sisters
- Community Service Agencies
- Christian Reformed World Relief Committee - Disaster Response Services

Each jurisdiction needs to liaise with non-governmental organizations within their district to determine the approximate number of volunteers who would be available during a pandemic.

During the interpandemic period, recruitment of volunteers, both those with health care skills and those without should take place primarily through existing agencies. These agencies already have recruitment, screening, training programs and management programs in place. It is important that health authorities and emergency planners establish communication with existing agencies to communicate community needs during a pandemic, in order that agencies may recruit and maintain a core group of volunteers with appropriate training. They may wish to add certain types of training to standard training programs in order to address issues regarding pandemic influenza. Specifically, volunteers should be aware that unlike other emergencies such as earthquakes or floods, the duration of the "emergency" will be longer for an influenza pandemic and more than one pandemic wave will likely occur. Since people view the risk of disease differently than the risk of injury, and will be concerned about bringing this disease home to their families, it is important that these issues are addressed during training sessions.

b. **Develop and maintain databases of volunteers**

Because maintaining up-to-date databases of volunteers is time consuming, difficult and expensive, health authorities will likely have to depend on existing volunteer agencies. Such agencies should be encouraged, where possible, to track trained and screened (those that had interviews, reference checks and criminal records checks) volunteers and track records of certificates or diplomas and maintain methods of communication. Health authorities may wish to encourage these agencies to keep their databases current, and to expand the information on their volunteers' skill sets or experiences, to include skill sets that would be required in a pandemic.

c. **Develop job descriptions and skill lists for volunteers**

Develop a list of jobs, job descriptions and skills based on the needs of the region or community and working in conjunction with volunteer agencies. (See Checklist of Functions and Personnel). This list can be used to determine which training programs are necessary and how best to recruit, train and assign volunteers in the interpandemic and pandemic periods.

d. **Develop volunteer recruitment, and screening procedures.**

Develop procedures that can be implemented quickly once a pandemic is declared. (See Pandemic Period – Recruitment, Screening and Deployment.)

e. **Monitor and track qualifications and certification**

Plan for methods to ensure health care workers, including volunteers are trained and certified for the tasks they are undertaking.

- Review the logistical and legal issues around developing databases of HCW's who have the training and skills to be deployed during a pandemic.
- Arrange with appropriate agencies to maintain databases of members for use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of those available for work in a crisis.
- Plan for a "Quick Check" method of confirming certification or qualification.
- If a volunteer is trained at an NT site during a pandemic, plan for ways to test and record the level of skills.

f. **Prepare to manage volunteers**

During a major crisis many people come forward who wish to volunteer. In some cases managing the numbers of people who come forward to volunteer is a major logistical effort in itself.

During the interpandemic period:

- Review emergency plans for managing an influx of volunteers.
- Plan for a volunteer co-ordinator or team – identify agencies, positions or individuals – to take responsibility for directing the process of accepting, screening, training and placing volunteers.
- Ensure resource information is available to the volunteer co-coordinator/team.
- Plan for a location for volunteer recruitment/management that is separate from existing hospitals or clinics to reduce congestion and security issues.

2.2.7 Provide Training

Both health care professionals and other workers will need training for dealing with pandemic influenza. Professionals may need training or refresher courses in tasks they don't normally perform, including supervision and management. Due to the limited number of health care professionals that will be available in the community, volunteers and other non-medically trained staff will likely be needed to perform direct patient care.

i) **Train the Trainer**

Health authorities and existing volunteer agencies, may establish programs to "train the trainers," to maintain resources to call on during a pandemic. Plan for where and how training programs will be delivered, ideally during the interpandemic period, but also during the pandemic.

ii) **Train for Self-Care**

All health care workers should be trained in self-care as it pertains to pandemic influenza treatment and symptom control and the ability to communicate the principles of self-care to others. As professionals will likely be required for the provision of medical services, teaching self-care skills may become part of the volunteers' role.

A number of jurisdictions are currently developing "Self-Care" modules designed to improve the quality of home care. (See the Clinical Care annex for more information). Jurisdictions are encouraged to share such resources and to develop other health information services for the public, e.g. 24-hour telephone health information services. Ensure that all those training in self-care are using consistent, accurate and up-to-date information.

Plan for methods to educate health care workers and the public in Self-Care. While some education will be done in advance, much of the education of patients and their families will take place in clinics, NT Sites, vaccination clinics during a pandemic.

iii) **Train Health Care Professionals**

A number of training programs exist which can be adapted for pandemic influenza. Health care professionals may need training for reassignment and training for supervision.

The time for training once a pandemic is underway will be extremely short; therefore training should be incorporated into existing programs now. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness.

Training may include medical training essential to working in a pandemic situation including:

- Infection control procedures
- Use of respirators and care of patients on respirators
- Worker and volunteer supervision
- Working with grieving families

Develop a plan for training/retraining health care workers who have not been working in health care (retirees, etc.) at the time of a pandemic. (See Resource Management Guidelines in Acute Care Settings (Annex H) for lists of Health Care Professionals.)

iv) **Train Volunteers**

During the interpandemic period, volunteer training may be left as much as possible to existing agencies. In areas without well-developed volunteer systems and agencies, planners may wish to review the need for developing, maintaining and funding core groups of volunteers trained for medical emergencies such as pandemic, and trained trainers.

All volunteers should be trained for

- Self-care and
- Infection prevention and control (routine or universal precautions).

Based on the Checklist of Functions for your jurisdiction, volunteers working in direct patient care may also be trained in:

- Basic personal care (Bed baths, bed pans)
- Observation of condition (temp, pulse, resp, etc.)
- Case definition, identify the illness
- Giving medications (pills, eye and ear drops, liquids)
- Oxygen administration
- Pressure ulcer prevention – skin care
- Ambulation, mobilization

Volunteers will also be needed who are trained in the following:

- Cleaning in health care facilities
- Records management
- Food preparation (Food Safety Courses)
- Workplace Hazardous Materials Information Systems (WHMIS) protocols
- Security staff trained in working with grief stricken people.

Review the Checklist of Functions for the training required in your jurisdiction. As far as possible, existing agencies should be encouraged to maintain skills in these tasks during the inter-pandemic period.

v) Training Resources and Programs

Curricula for the above listed skills are available through existing agencies.

Training programs include, but are not limited to:

- on-line courses, including an Infection Prevention on-line course for infection control issues at www.igc.org/avsc/ip/index.html
- Association for Practitioners in Infection Control and Epidemiology training manual "*Influenza Prevention: A Community and Healthcare Worker Education Program*" < http://www.apic.org/resc/>
- St. John Ambulance Brigade. Brigade Training System. 1997
- St. John Ambulance Brigade. Handbook on the Administration of Oxygen. 1993. ISBN 0-919434-77-0
- The Canadian Red Cross Society. *Yes You Can prevent disease transmission.* 1998
- Nursing colleges training programs (i.e. the basic care programs for health care aides)
- CHICA, APIC and the Infection Control Association in the UK have a "tool kit" with detailed forms and templates that could be used at the NT site, 2002. [reference: "Infection Control Toolkit" - Strategies for Pandemics and Disasters, can be ordered through the Community and Hospital Infection Control Association (CHICA-Canada), Phone: 204-897-5990 or toll free 866-999-7111; Email : chicacda@mb.sympatico.ca]

2.2.8 Establish Immunization Recommendations

While no vaccine for the pandemic strain of influenza will likely be available in advance of the arrival of the pandemic in Canada, health care workers should be up-to-date with the other recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Where possible volunteers already working with existing agencies or recruited in the interpandemic period should be encouraged or required to be up-to-date with respect to the recommended immunization schedule. In addition, depending on type of work they will be doing during the pandemic, it may be appropriate to recommend that volunteers receive the same immunizations that are recommended for health care workers (e.g., hepatitis B vaccine). Volunteer recruiters should also ask for immunization records, where possible, to facilitate identification of individuals who are not up-to-date with respect to the current recommended schedule.

2.2.9 Supporting Workers in NT Sites

Plans to extend support programs for health care workers (including trainees, volunteers and retirees) to all workers at NT sites should also be included in overall plan for the management of human resources. Support should include: provision of food and drink, grief counseling, support for families and job protection.

2.2.10 Insurance/Licensing

In addition to addressing any liability / insurance issues in relation to health care professionals and other non-professional health care workers, these issues must also be addressed for retired/trainee health care professionals and volunteers performing patient care and other non-medical tasks.

There are a number of insurance issues which present major concerns, especially the insurance required for workers at NT sites including volunteers. The Non-Traditional Sites and Workers subgroup has noted that issues around personal liability and workers compensation (including compensation for acquired illness) may present a powerful barrier and disincentive to the recruitment of health care workers, especially volunteers, during a crisis. A recommendation has been put forth, that these issues be addressed on a national basis, and be reviewed by provincial/territorial planners to determine the legislative, administrative, licensing and other options within each province and territory.

The scale of a pandemic may require significant changes to scopes of practice of professionals, and delegation of tasks to non-professional staff and volunteers. These raises many issues regarding insurance and licensing which must be reviewed with respect to existing insurance, licensing practices, cross jurisdictional licensing, labour agreements and Emergency Legislation. The types of insurance which must be reviewed include:

- Malpractice and personal liability
- Transfer of licensing between jurisdictions
- Workers compensation
- Accidental death and dismemberment.
- Directors and officers liability (depending on the administrative authority)

Malpractice/Liability Insurance of Workers and Volunteers

Review liability protection/malpractice insurance coverage to see how it will extend to cover workers in Non-Traditional Sites, professionals, those taking on tasks not usually part of their scope of practice and volunteers.

Transfer of Licensing Between Jurisdictions

Each province/territory must review with its professional licensing bodies (medical colleges, nurses associations) how pandemic workers with varying qualifications, or licensed in other jurisdictions, may deliver some services. Professional licensing bodies may be asked to liaise and extend privileges to out of province professionals, or foreign trained professionals based on their standing in another jurisdiction.

Workers' Compensation

Each province/territory must make appropriate arrangements with their workers' compensation board if pandemic volunteers are to be covered by workers' compensation. A Memorandum of Understanding (MOU) between the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP) Canada and the provinces/territories asserts that registered volunteers or persons compelled for emergency service work are protected by workers' compensation during emergency response, as long as they are registered. Some volunteer agencies have a liability policy for their volunteers. In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under Emergency Preparedness Legislation. However, there are a number of issues to be resolved with workers' compensation Boards at the provincial level:

- Definition of Health Care Workers for this purpose
- Definition of volunteers for this purpose
- Does the policy require a declaration of Emergency and at what level of government or would the insurance come into effect once the Minister of Health declares a Pandemic?
- Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?
- Would compensation be available if volunteers became ill rather than injured?

Accidental Death and Dismemberment

Usually a subset of workers' compensation. Ensure that this insurance is available.

Directors and Officers liability

If the health care site or service is a part of an existing institution, hospital, or health authority, determine whether existing insurance can be extended to those managing sites or services elsewhere or obtain this insurance elsewhere.

2.3 Human Resource Planning During the Pandemic Period

Once a pandemic is declared there will be a massive effort required to implement the programs and activities developed during the interpandemic period to manage the human resource issues. Activities will include:

- Activation of the Human Resource Management Team
- Implement Volunteer Management Team
- Provide Human Resource Management Team with lists and job descriptions of personnel required.
- Contact supporting organizations to request additional personnel with special skills, e.g. Translation Services, Churches/Counselling Services.

2.3.1 Contact Health Care Professionals

By the time Pandemic is declared most existing health care institutions and agencies will be aware that the WHO and Health Canada have been monitoring a growing situation. Communications with professionals is vital at this stage as professionals will be required to take on additional or changed responsibilities and may be reassigned to other sites or activities.

2.3.2 Volunteer Recruiting, Screening, Training, Deployment

a. **Communicate with volunteer agencies**

Communicating with the Volunteer Agencies to co-ordinate the activities of voluntary efforts will be one of the first tasks of the Volunteer Management Team.

b. **Call for volunteers**

In emergencies often volunteers come forward. This potentially large and commendable response needs to be channelled so that those with needed skills can be placed where they are needed most and their skills can be optimized. However, not all volunteers will have the skills, ability or stability required for the jobs they want to do. Therefore, any calls for volunteers should identify the needed skill sets to streamline the recruitment process.

Volunteer recruitment and screening needs to be considered, including:

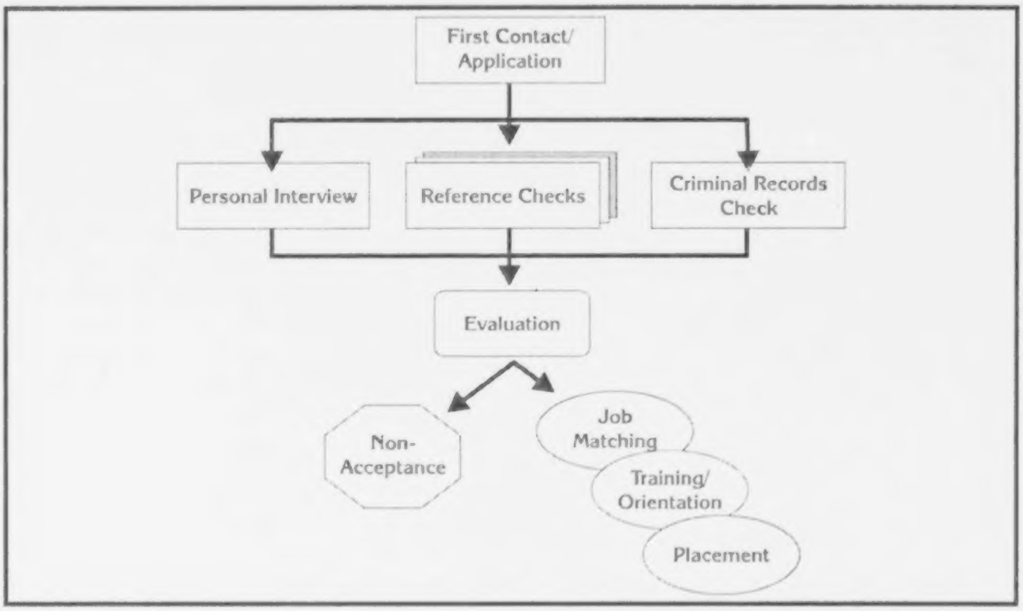
- position descriptions
- advertising the need for volunteers
- screening criteria
- volunteer application forms
- interview
- reference checks
- criminal record check.

Useful resources include, but are not limited to:

- The Canadian Red Cross Society. National Volunteer Policy Manual
- The Canadian Red Cross Society. The 30-Minute Quick-Response Guide. 1995.
- The Canadian Red Cross Society. Disaster Response Team: Participant Attachments. 1996.
- St. John Ambulance Brigade. Screening Brigade Volunteers. 2000.

c. Volunteer screening

Volunteers in a pandemic may be placed in positions of significant trust and authority, with vulnerable people. Volunteer positions will vary in nature, in the type of training, skills and abilities required, in the setting and in the level of risk to the volunteer. Volunteer screening must take all of these issues into consideration and provide for interviews, review of qualifications and appropriate assignment. In addition, it is important to ensure that volunteers do not have a personal history, which indicates they are incompatible with the safety and well being of vulnerable people.



Screening processes must review the stability of the individuals and may include criminal record checks. Information on procedures used by the Red Cross, and St. John Ambulance is available through their offices.

The most important part of volunteer recruitment and assignment is the interview process. Reference checks are also a good screening tool. A criminal records check is usually required by law for volunteers who work with vulnerable people. However, during the pandemic, police services may not have the resources due to illness and/or have other high priority duties to provide this service. Therefore more emphasis may need to be placed on conducting a good interview and reference check process. It will be important use trained volunteer recruiters, preferably identified and trained during the interpandemic period.

- Check existing emergency plans, regional or municipal plans for information on recruiting and screening volunteers
- Partner with existing agencies, where possible.
- Review Red Cross, St. John Ambulance and other resource documents

Due Diligence: The volunteer recruitment process should include a briefing meeting on risks and infection control (routine or universal precautions), and should require the individual to sign an agreement acknowledging they have been informed of the risks and protections, prior to being assigned to a placement.

2.3.3 Training During the Pandemic

Training programs developed or planned during the interpandemic period should be "geared up". These will include those programs listed in the interpandemic section of this document.

Training for Families/Caregivers

Family members of patients may stay at the site to help care for a patient or may be asked to take a patient home. In either case, the family member will need some training, especially in the areas of re-hydration, infection control, observation and assessment, and self-care. In addition, families may require counselling to help them support those who are ill or to cope with fear and grief.

Training for Support Tasks

In addition to training for patient care there are needs for training for intake, housekeeping, maintenance and other tasks. There are standards set for training of all workers related to health care, including housekeeping and maintenance staff. In many cases Staff Associations set these standards.

It is important to note that during a crisis it will not be possible to demand the same level of training for volunteers, which would normally be required of staff. Thus, it will be important to consider what are the minimum standards and basic information that must be communicated on certain issues.

2.3.4 Supporting Workers in NT Sites

Support provided to Workers at Non-Traditional Sites may include:

- Emotional support/grief counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).
- Family care (for children, seniors, sick family members who do not require hospitalization). This poses some questions around infection control if gathering children or others together for group care.
- Job protection for workers who move from other jobs during pandemic.
- Job protection for spouses who do family care to allow workers to work in health care.

2.3.5 Communicate Changes to Licensing and Insurance Provisions

Inform site managers and coordinators, as well as health care professionals in all sites and health care programs of changes in licensing and insurance and what it will mean for flexibility in staff deployment and additional staffing.

2.4 Human Resource Planning During the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. Assessment of insurance claims or claims for assistance will also occur during this period.

K Canadian Pandemic Influenza Plan: Communications Annex

Introduction

The objective of this annex is to ensure that Canada's health partners are prepared to respond to the enormous public communications challenges associated with an influenza pandemic. Specific activities designed to promote consistent, coordinated and effective public communications of federal, provincial, territorial governments and other health partners are set out. As well, emergency communications options are described to ensure that the public communications demands of various scenarios are met.

Operational plans for public communications will reside within the specific organisations involved in the response. For example, Health Canada will use its Crisis/Emergency Communications Guidelines (September 2003), just as specific provincial and territorial ministries will rely on their own plans and systems.

Strategic Considerations

1. Provincial, territorial health ministries and/or local authorities assumes lead responsibility for public communications within their jurisdiction.

   Health Canada is the lead organisations for public communications if the pandemic has moved beyond a single province or if a national emergency has been declared. Specific responsibilities include disease surveillance and national guidelines for infection control.

   Canadians are unlikely to distinguish between levels of government in the event of a health emergency. Public communications among all involved organisations must be coordinated and consistent.

2. Public Communications around an influenza pandemic will occur in the international context. Key audiences, especially the media, will access various information sources from around the globe including the World Health Organisation. Communications channels must be opened with the WHO, HHS and the CDC to ensure an ongoing exchange of information, key messages and information products.

3. Canadians will turn to various sources to obtain the information they need and want during a pandemic scenario. Professional groups such as the Canadian Medical Association, Nurses Union, Canadian Pharmacists Association will be key partners in disseminating information, as will NGOs such as the Red Cross, Salvation Army, and others. Strong communications networks must be established with these organisations to ensure an ongoing exchange of information, key messages and information products.

4. The public communications demands of an influenza pandemic will likely exist at the top end of anything organisations have experienced in the past. In addition to the full weight of the individual organisation's communications capacity being brought to the table, organisations must find ways to work together to ensure as efficient a national effort as possible.

5. Public communications strategies must consider the information needs of:
    - communities directly affected
    - health professionals and health facility staff
    - regional, national and international media
    - other federal, provincial, territorial and international government organisations
    - key non-governmental organisations (e.g., Canadian Medical Association, Canadian Nurses Association, Red Cross, etc.)
    - industry representatives (e.g., pharmaceutical sector, medical supply sector)
    - specific ethnic communities that may require translated information packages into languages other than English or French
    - internal, non-implicated staff
    - international partners and stakeholders (WHO, HHS, CDC)
    - infectious disease experts
    - Members of Parliament and legislatures
    - Aboriginal communities

    Note: See Section 11 for additional information on audiences

6. Risk communications principles must be applied in developing both content and strategy for public communications activities in response to an influenza pandemic.

Notification Process

1. **Integration of communications staff into main notification procedures**

    Communications staff will be integrated into the notification processes within the Canadian Pandemic Influenza Plan. It is the responsibility of emergency managers in the implicated organisations to ensure that their own organisation's communications staff are alerted to a developing problem.

2. **Notifying communications staff of other governments and health partners**

    Although the lead province or territory will likely notify other organisations, Health Canada will be responsible to ensure communications staff from the provinces and territories have been notified. This will be done through the Health Emergency Communications Network.

    Similarly, Health Canada will be responsible for alerting communications staff of key non-governmental organisations. This will be done through a network currently in development.

Public Communications Coordination

1. **Health Emergency Communications Network(HECN)**

   Teleconferences of the HECN will be organised to ensure coordinated public communications messages and activities among F/P/T organisations.

   Health Canada will be responsible for organising these teleconferences, frequency will depend on the need identified by HECN members.

2. **Intergovernmental Coordination**

   Health Canada and involved health ministries will lead teleconferences of other implicated departments to ensure coordinated public communications activities across respective governments. For example, Health Canada may convene teleconferences with communications representatives of Department of Foreign Affairs and International Trade, Office of Critical Infrastructure Protection and Emergency Preparedness, the Privy Council Office and others. Provincial and territorial health ministries will convene similar intra-governmental meetings.

3. **International Coordination**

   Contact – either through email or by teleconference – must be made with key international health organisations including the World Health Organisation, the department of Health and Human Services (US) and the Centers for Disease Control and Prevention (US) to share public communications messages, and coordinate public communications activities.

   Health Canada will engage international contacts and report back to the HECN.

Establishment and Coordination of Toll-Free Lines

1. Involved organisations will likely set up toll-free information lines for both the health professionals and the general public. Background material used by operators on such lines should be shared to ensure that consistent information is being disseminated.

Website Management

1. Websites of all involved organisations should include links to central information sources (such the World Health Organisation and Health Canada), as well as other involved organisations and information sources.
2. If the emergency escalates, a central, emergency specific website should be established. The address of such a central website would be included as part of the public communications activities of all involved organisations. Health Canada is currently developing options for such a central, emergency specific website.

Recommended Public Communications Activities

Phase 0, Level 1: Novel virus identification in a human	› Notification of the Health Emergency Communications Network(HECN), as well as communications staff with international and non-governmental organizations › Review existing communication systems (e.g., emergency contact lists, toll free capacity, dedicated Internet site capacity, information sharing systems) › Work with partners to improve the local, provincial/territorial and federal informatics infrastructure to support the potential information campaign › Ensure names/numbers/e-mails are up-to-date and document sharing is possible
Phase 0, Level 2: Human infection confirmed	› Activate inter- and intra- governmental response through national teleconferences (including the HECN, and the NGO health emergency communications group) › Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health › Ensure that rapid 24 hour translation capacity is in place and that all responders know how to access this resource › Ensure that web-site production staff are alerted to the potential need for development of sites and linkages › Identify gaps in the existing systems that will require additional resources (e.g., funding for toll free lines, dedicated press conference facilities and HR support for comm. staff) › Stage background technical briefings for media, external experts and other stakeholders
Phase 0, Level 3: Human-to-human transmission confirmed	› Increased engagement with international partners › Establish ongoing communications with media, partners and public › Activate Emergency Communications processes (as set out in the Emergency Communications Plans within each implicated organizations) › Establish 1) communications lead 2) strategic considerations 3) draft initial response › Recruit/supply additional resources to fulfill previously identified gaps in the existing systems › Implement plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees

Phase 1: Pandemic confirmed	› Institute daily conference calls of the HECN, ensure it is integrated with PIC meetings › Ongoing communication with global partners › Ongoing communications with media, partners and public › Establishment of joint website/linkages › Launch multi-media campaign targeting specific target groups including the general public, health care workers and local community support network › Stage joint media and stakeholder briefings with representatives of Health Canada, relevant P/T officials, CMOH rep, etc.
Phase 2: Outbreaks in multiple geographic areas (within Canada)	› Ongoing communication with HECN, international organizations and other health partners including NGOs › Ongoing communications with media, partners and public › Training of additional communication leads to allow for staff rotation › Evaluation of implemented communication strategy › Updating of public resources › Ensure that all audiences, including media, key opinion leaders, stakeholders, employees are satisfied with the level of communication › Daily joint briefings of media involving representatives of the implicated organizations
Phase 3: End of first wave	› Evaluate communication strategy › Update public education materials and scripts for phone line staff › Scale back staffing as need diminishes
Phase 4: Second or later waves	› As per previous phases
Phase 5: Post-pandemic/ recovery	› Review performance measurement criteria and evaluate response

Health Emergency Communications Network - Contacts

Name	Office	Cell
Sheila Watkins, Health Canada Élaine Chatigny, Health Canada	(613) 957-2979 (613) 957-2987	
John Rainford, Health Canada	(613) 946-7245	
Andrew Swift, Health Canada	(613) 957-2988	
Carol Chawrun, Alberta Health and Wellness	(780) 427-7164	
Michelle Stewart, British Columbia Ministry of Health Planning & Health Services	(250) 952-1423	
Joe Czech, Manitoba Health	(204) 945-0750	
Carole Payne, Health and Wellness, Province of New Brunswick	(506) 453-2536	
Carolyn Chaplain, Government of Newfoundland and Labrador	(709) 729-1377	
Laura Seddon, Department of Health and Social Services Government of the NWT	(867) 920-8927	
Kim Silver, Nova Scotia Department of Health	(902) 424-7942	
Department of Health and Social Services Government of Nunavut	(867) 975-5700	
John Bozzo, Ontario Ministry of Health & Long-Term Care	(416) 327-4352	
Connie McNeill, PEI Department of Health and Social Services	(902) 368-6172	
Debra Dollard, Ministère de la Santé et des Services sociaux	(418) 266-8905	
Marg Moran McQuinn, Saskatchewan Health	(306) 787-8433	
Patricia Living, Department of Health and Social Services, Government of Yukon	(867) 667-3673	

International Communications Contacts

International		
U.S. Centers for Disease Control and Prevention	Jana Telfer, Manager, Media Relations	404-639-7290
Health & Human Services (USA)	Marc Wolfson, Public Affairs Bill Hall, Public Affairs	202-205-1300 202-690-7264
World Health Organization	Dick Thompson	+41 22 791 2684
Department of Health (UK)	Lis Birrane, Chief Media Officer	20 7210 5225

NGO Communications Contacts

Organisation	Name	Contact
Canadian Association of Emergency Physicians	Sue Norrington	613-523-3343 ext. 15
Canadian Healthcare Association	Rhona Lahey	613-241-8005 ext. 210
Canadian Infectious Disease Society	Matthew Perry	613-260-3233
Canadian Medical Association	Jill Skinner Carole Lavigne	613-731-8610 ext. 2329 613-731-8610 ext. 1266
Canadian Nurses Association	Karen McCarthy Joanna Filion	613-237-2133 ext. 252 613-237-2133 ext. 312
Canadian Pediatric Society	Elizabeth Moreau	613-526-9397 ext. 231
Canadian Pharmacists Association	Janet Becigneul	613-523-7877 ext. 267
Canadian Public Health Association	Judy Redpath Louise Cécire	819-827-3648 613-725-3769 ext. 127
Canadian Red Cross	Suzanne Charest Cheryl Smith	613-740-1928 613-740-1989
College of Family Physicians of Canada	Leslie Stafford	905-629-0900 ext. 303
Royal College of Physicians and Surgeons of Canada	Pierrette Leonard Genevieve Lacroix	613-730-6201 613-730-6286
St. John Ambulance	Julie Desjardins	613-236-1283 ext. 228
Salvation Army of Canada	Jim Ferguson	613-234-3372

Audiences to Consider

Audience	✓
Public within the circle of the emergency. *Concerns*: Personal safety, family safety, stigmatization, property protection.	
Public immediately outside circle of the emergency. *Concerns*: Personal safety, family safety, interruption of normal life activities.	
Public health and medical professionals involved in the emergency. *Concerns*: Resources adequate to respond, personal safety, family safety.	
Public health and medical professionals not involved in the emergency. *Concerns*: Ability to respond to patients with appropriate information, access to treatment supplies if needed/wanted.	
Emergency response and recovery workers. *Concerns*: Resources to accomplish response and recovery, personal safety, family safety.	
Media *Concerns*: Personal safety, access to information and spokespersons, deadlines.	
Stakeholders and partners specific to the emergency. *Concerns*: Inclusion in decision-making, access to information, and other resources	
Trade and industry. *Concerns*: Business issues (loss of revenue, liability, business interruption) and protection of employees.	
Members of Parliaments/Legislatures *Concerns*: Informing constituents, review of statutes and laws for adequacy and adjustment needs, opportunities for expressions of concern.	
Civic leaders, local, provincial, and national. *Concerns*: Response and recovery resources, liability, leadership, and quality of response and recovery planning and implementation; opportunities for expressions of concern; trade and international diplomatic relations.	
Infections disease specialists, likely providing comment to media *Concerns*: Access to accurate information, updates on specific steps being taken	

L Federal Emergency Planning Documents

This annex includes documents provided by the Centre for Emergency Preparedness and Response (CEPR), Health Canada. The documents provided at this time include:

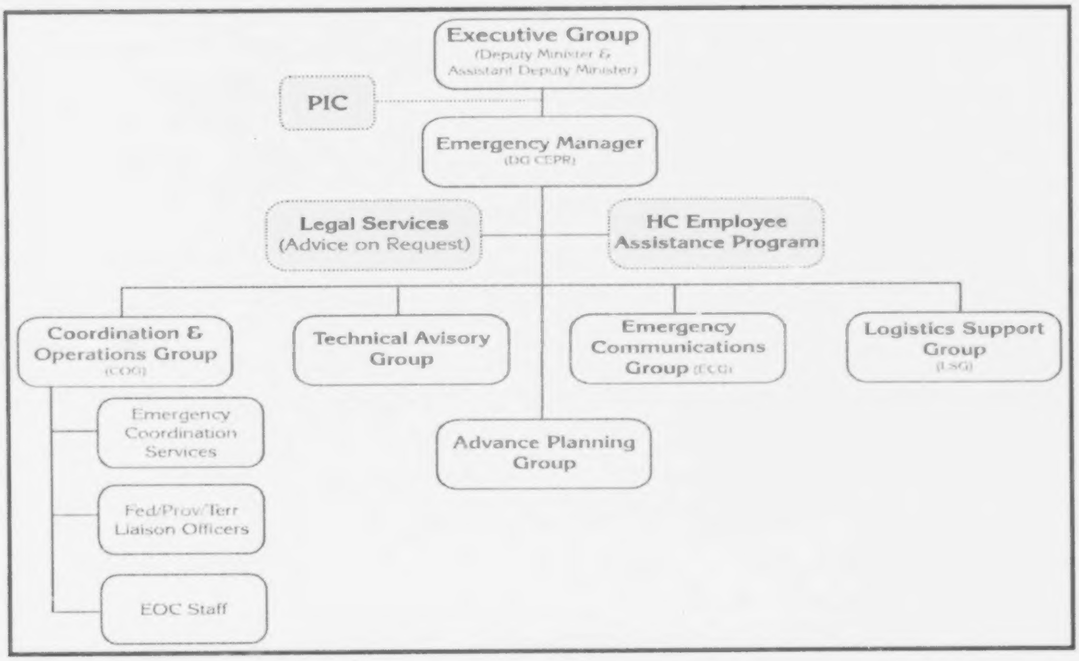
- Generic checklist of roles and responsibilities of the various groups in the emergency management structure during Public Health emergencies.
- Departmental Emergency Response Structure: Pandemic Influenza

Generic checklist of roles and responsibilities of the various groups in the emergency management structure during Public Health emergencies

Roles and Responsibilities	
Executive Group (EG)	› advises Minister (s) › activates/deactivates the Emergency Response Plan › provides direction to manage the response › authorises and directs the commitment of Departmental resources and release of public communications › provides overall guidance and oversight functions
Emergency Manager (EM)	› advises the EG on activation and deactivation of the plan › initiates operations and manages operational response › advises EG on the conduct of response › approves liaison to federal co-ordinating agency and external response partners › reviews Public Communication Material › approves SITREPS and reports › advises EG regarding resource availability and recommends deployment of departmental resources
Co-ordination and Operations Group (COG)	› respond to requests for assistance from response partners › coordinates the advice and assistance for the emergency, including the activities of other groups in the EOC › co-ordinates activities of liaison officers › creates task teams to deal with response issues › directs required HC and seconded staff › advises and recommends to Emergency Manager (EM) › makes routine decisions on behalf of EM, Maintains logs of all activities › manages details of the operation

Roles and Responsibilities	
Technical Advisory Group (TAG)	› disease epidemiology, surveillance and medical response as required › impacts on food, water supply, air quality & health matters › radiation and related matters › environmental and clinical sampling › social impact of the activation & other relevant issues
Emergency Communication Group (ECG)	› advise Emergency Manager on communication strategies & media messages › monitors and analysis, media reports and comments › liaison with F/P/T communications coordinating groups › develops communications plans › prepares communications materials for review
Logistics and Support Group (LSG)	› support to Emergency Manger, COG,TG and ECG › co-ordinates provision of support to external partners › provides security, logistics of supplies and equipment
Advance Planning Group(APG)	Provides risk assessment and management concerning: › medium and long term policy, planning, development and direction concerning the response › considers the policy and socio-economic ramifications of the emergency › assists in the transition from the Response to Recovery Phases of the emergency › anticipates the next stage in an operation to overcome the inevitable time lag in the implementation of measures and the application of resources ***Remarks*** The need for this group was emphasized during SARS crisis. Its roles & responsibilities are yet to be discussed at DEPC and other levels.

Departmental Emergency Response Structure: Pandemic Influenza


Executive Group
(Deputy Minister & Assistant Deputy Minister)
PIC
Emergency Manager
(DG CEPR)
Legal Services
(Advice on Request)
HC Employee Assistance Program
Coordination & Operations Group
(COG)
Technical Avisory Group
Emergency Communications Group (ECG)
Logistics Support Group
(LSG)
Emergency Coordination Services
Fed/Prov/Terr Liaison Officers
EOC Staff
Advance Planning Group